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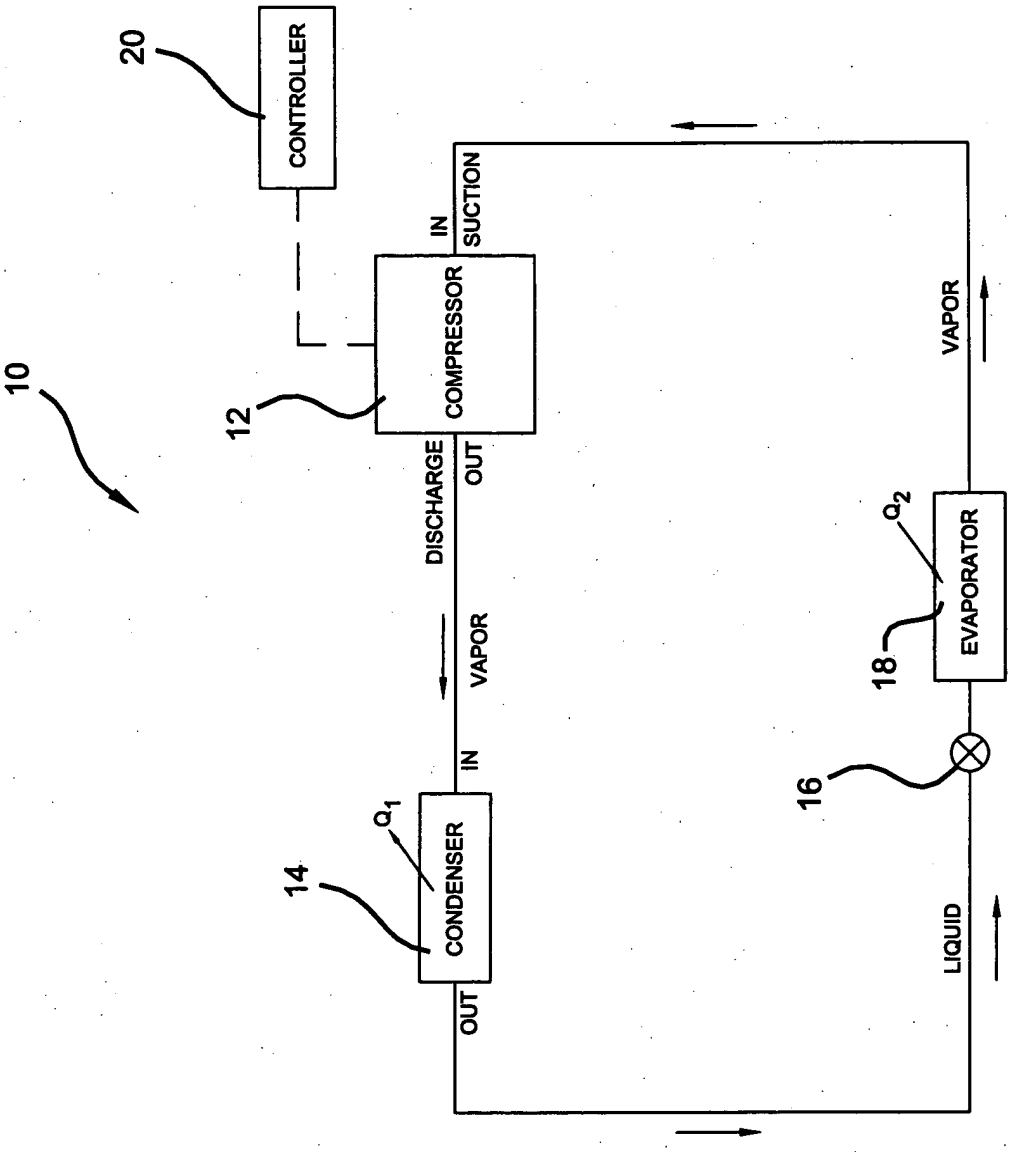

10
20
CONTROLLER
12
COMPRESSOR
IN
SUCTION
DISCHARGE
OUT
VAPOR
IN
Q_1
14
CONDENSER
OUT
16
Q_2
18
EVAPORATOR
VAPOR
LIQUID

FIG 1

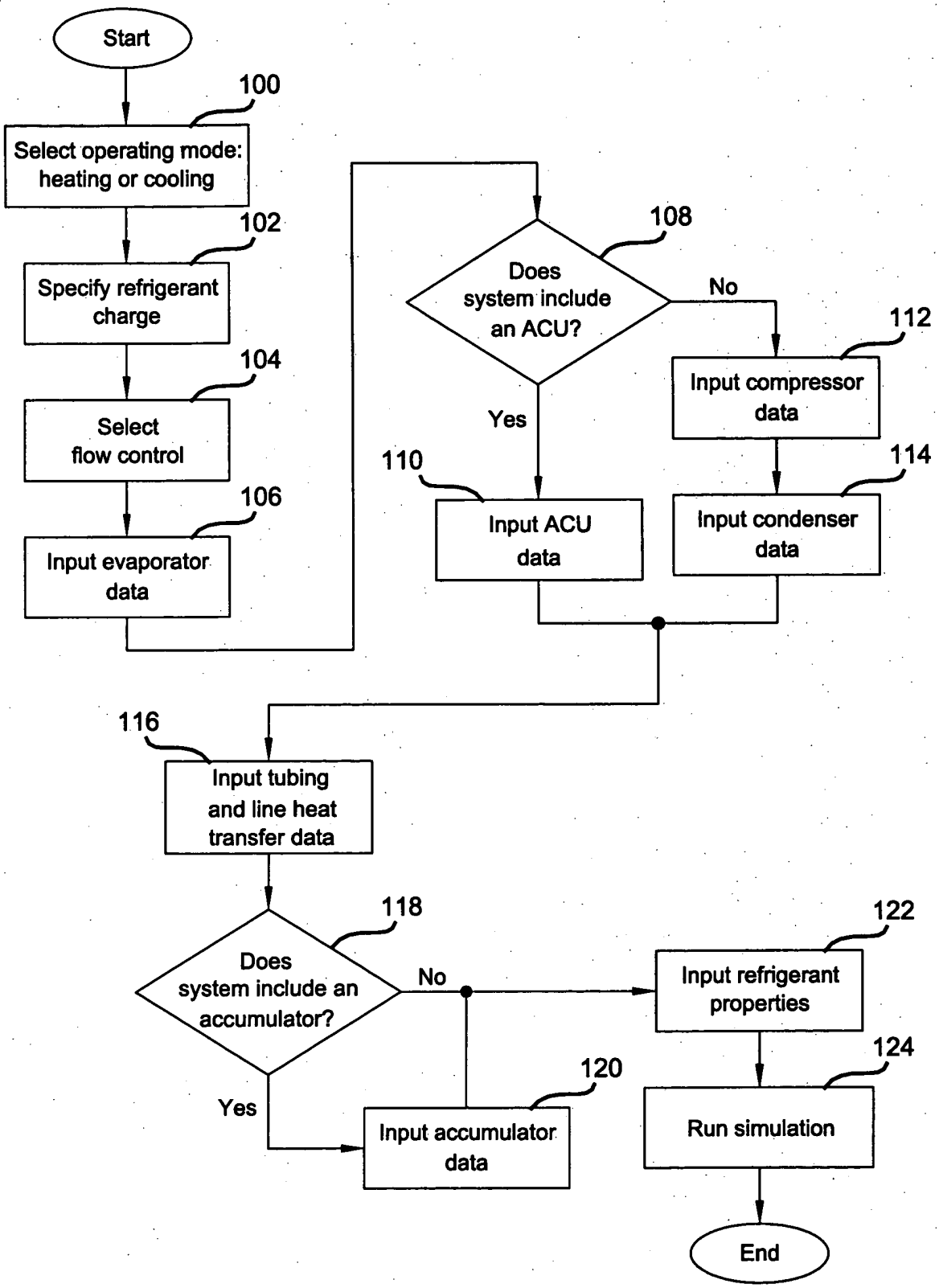

Start
100
Select operating mode: heating or cooling
102
Specify refrigerant charge
104
Select flow control
106
Input evaporator data
108
Does system include an ACU?
No
Yes
110
Input ACU data
112
Input compressor data
114
Input condenser data
116
Input tubing and line heat transfer data
118
Does system include an accumulator?
No
Yes
120
Input accumulator data
122
Input refrigerant properties
124
Run simulation
End

FIG 2

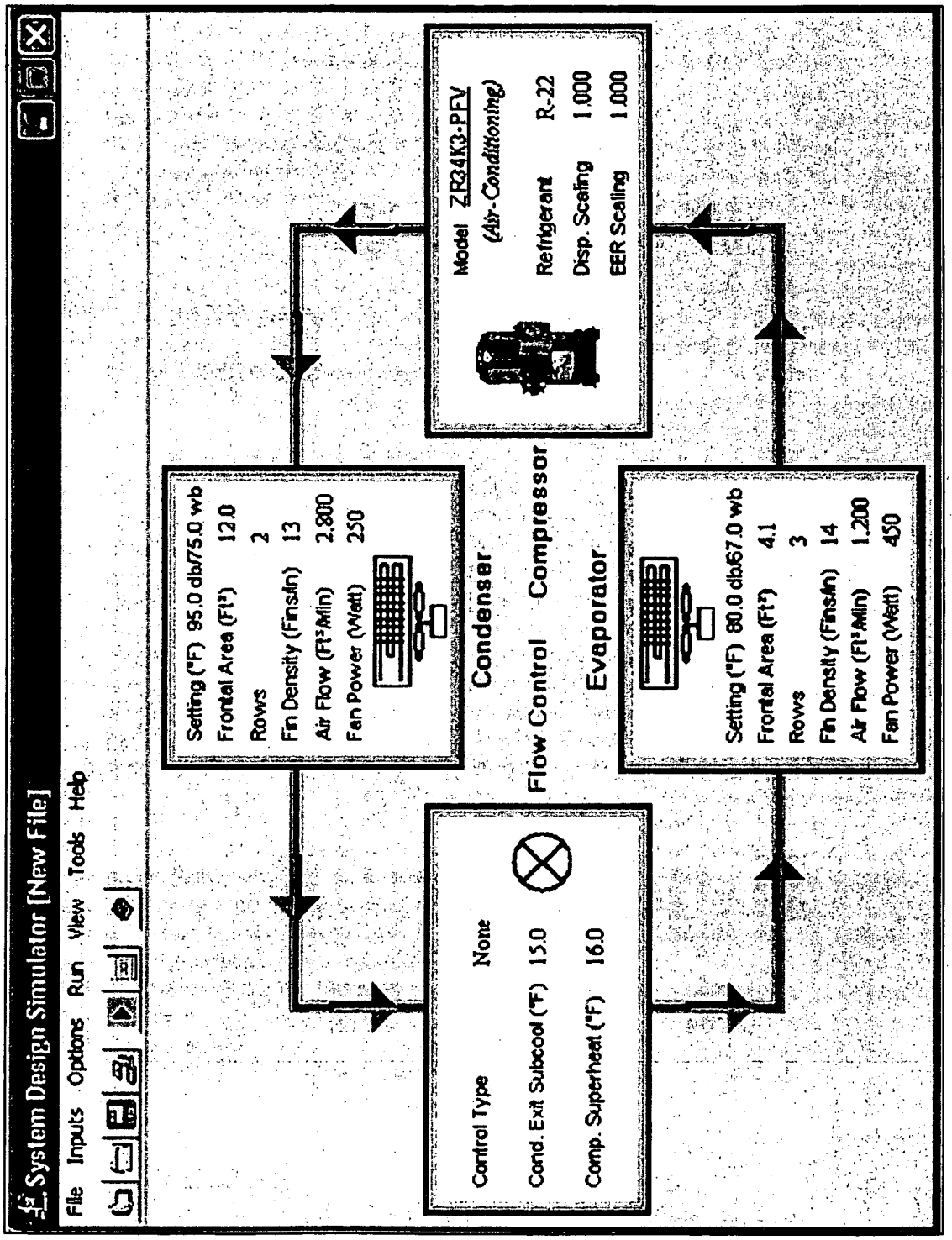

System Design Simulator [New File]
File Inputs Options Run View Tools Help
Model ZR34K3-PFV
(Air-Conditioning)
Refrigerant R-22
Disp. Scaling 1.000
EER Scaling 1.000
Setting (°F) 95.0 db/75.0 wb
Frontal Area (Ft²) 12.0
Rows 2
Fin Density (Fins/in) 13
Air Flow (Ft³/Min) 2,800
Fan Power (Watt) 250
Condenser
Flow Control
Compressor
Evaporator
Setting (°F) 80.0 db/67.0 wb
Frontal Area (Ft²) 4.1
Rows 3
Fin Density (Fins/in) 14
Air Flow (Ft³/Min) 1,200
Fan Power (Watt) 450
Control Type None
Cond. Exit Subcool (°F) 15.0
Comp. Superheat (°F) 16.0

FIG 3

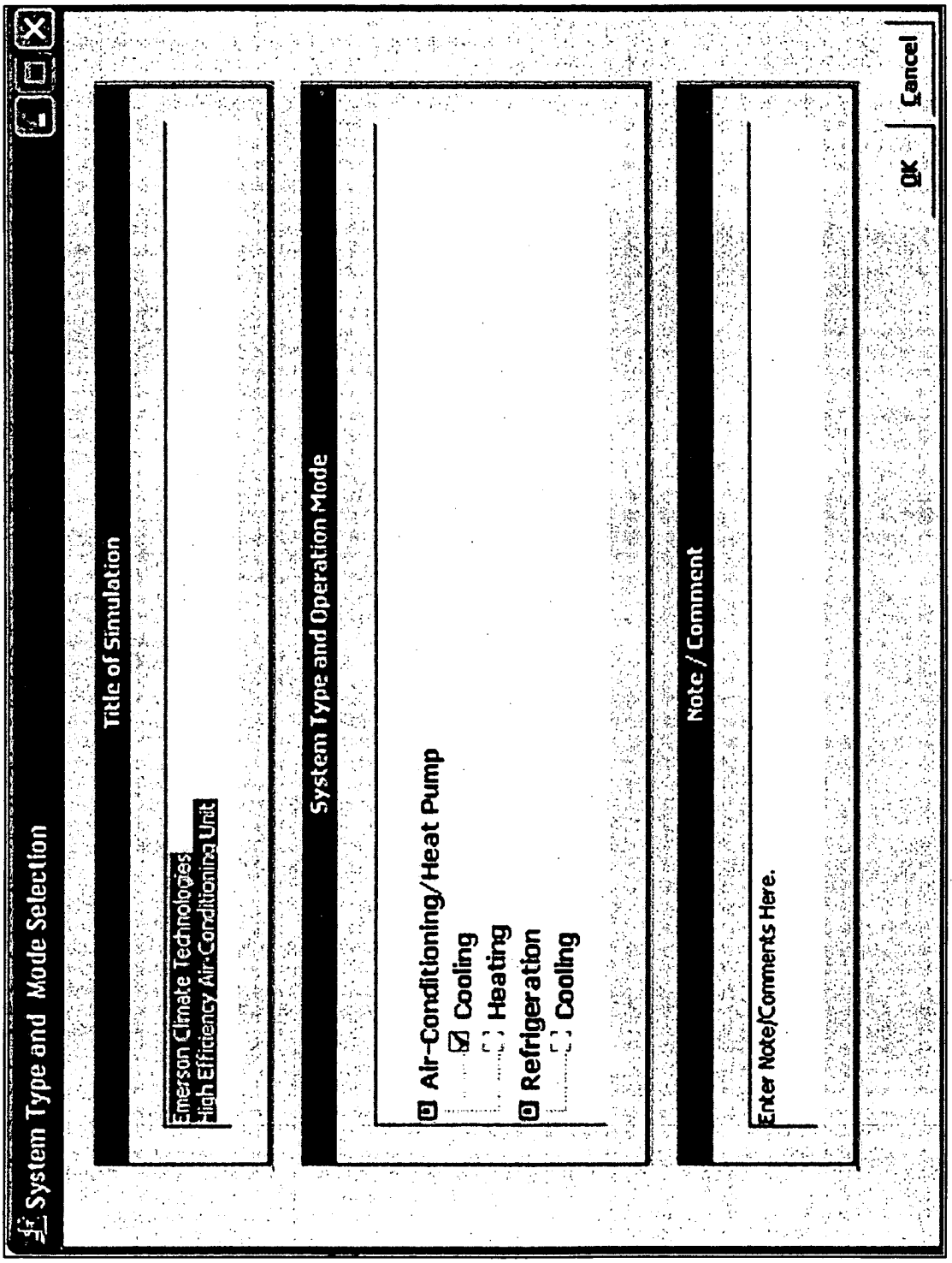

System Type and Mode Selection
Title of Simulation
Emerson Climate Technologies
High Efficiency Air-Conditioning Unit
System Type and Operation Mode
Air-Conditioning/Heat Pump
Cooling
Heating
Refrigeration
Cooling
Note / Comment
Enter Note/Comments Here.
OK
Cancel

FIG 4

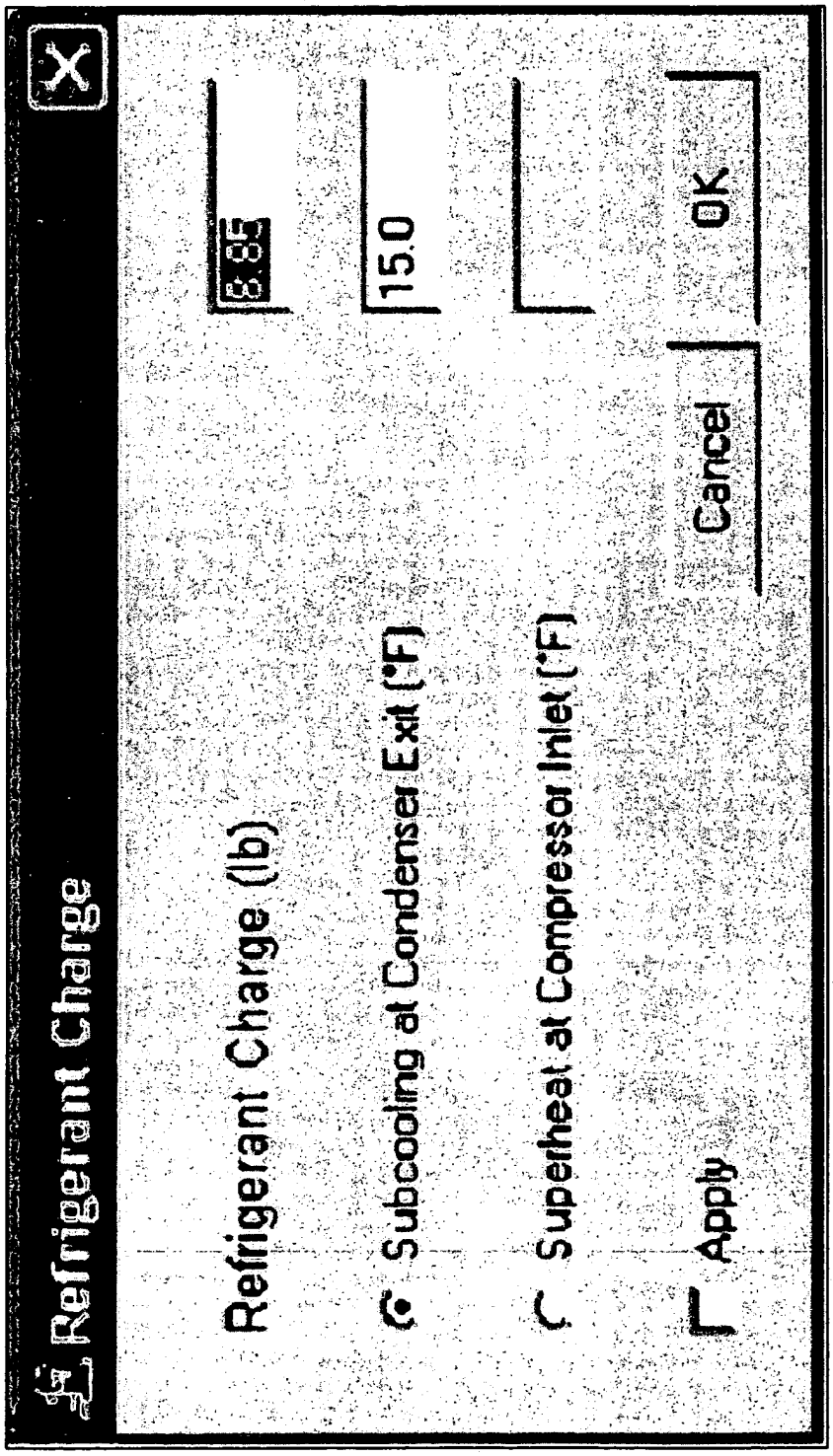

Refrigerant Charge
Refrigerant Charge (lb)
8.85
Subcooling at Condenser Exit (°F)
15.0
Superheat at Compressor Inlet (°F)
Apply
Cancel
OK

FIG 5

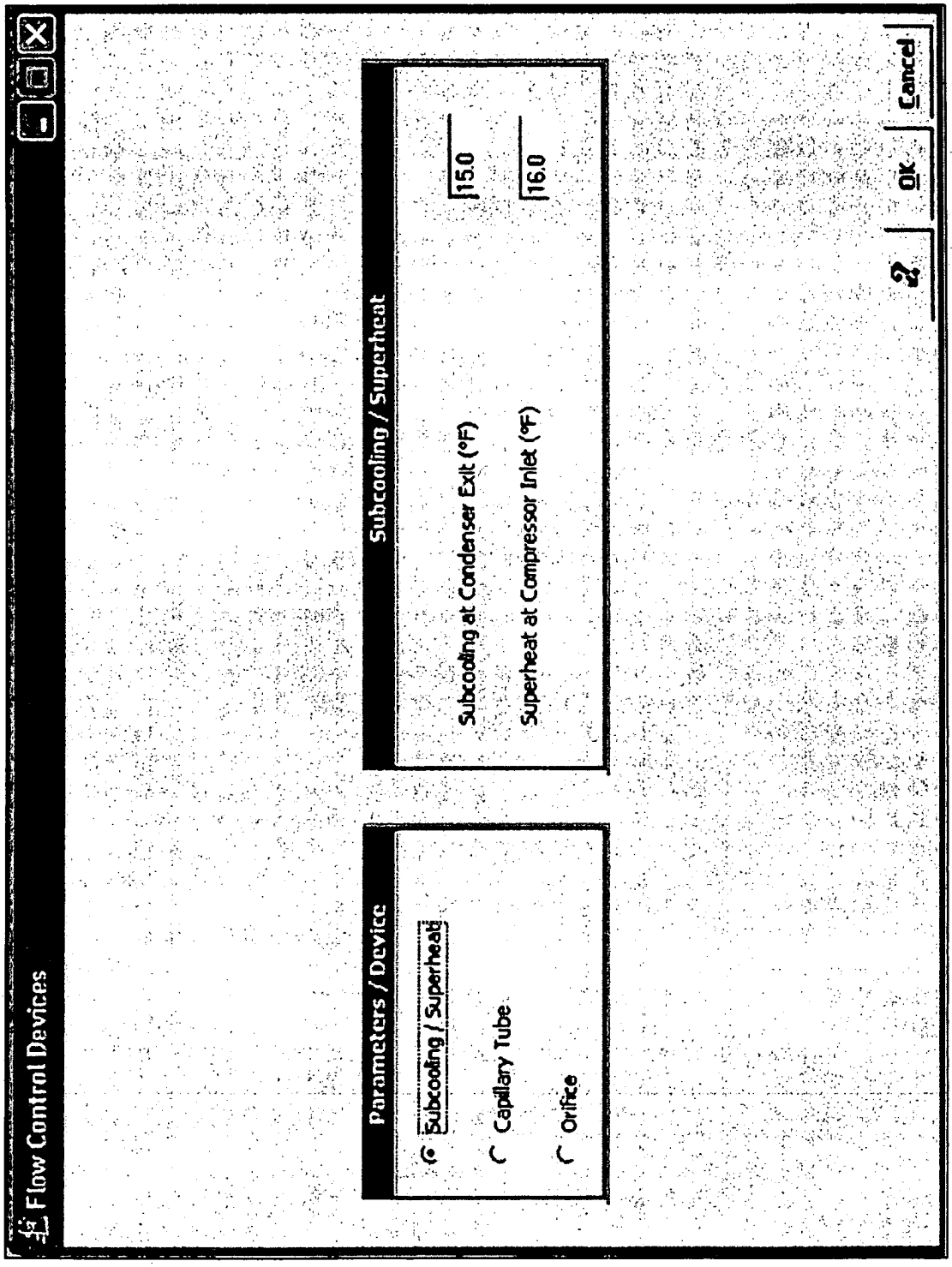

Flow Control Devices
Parameters / Device
Subcooling / Superheat
Capillary Tube
Orifice
Subcooling / Superheat
Subcooling at Condenser Exit (°F)
15.0
Superheat at Compressor Inlet (°F)
16.0
?
OK
Cancel

FIG 6

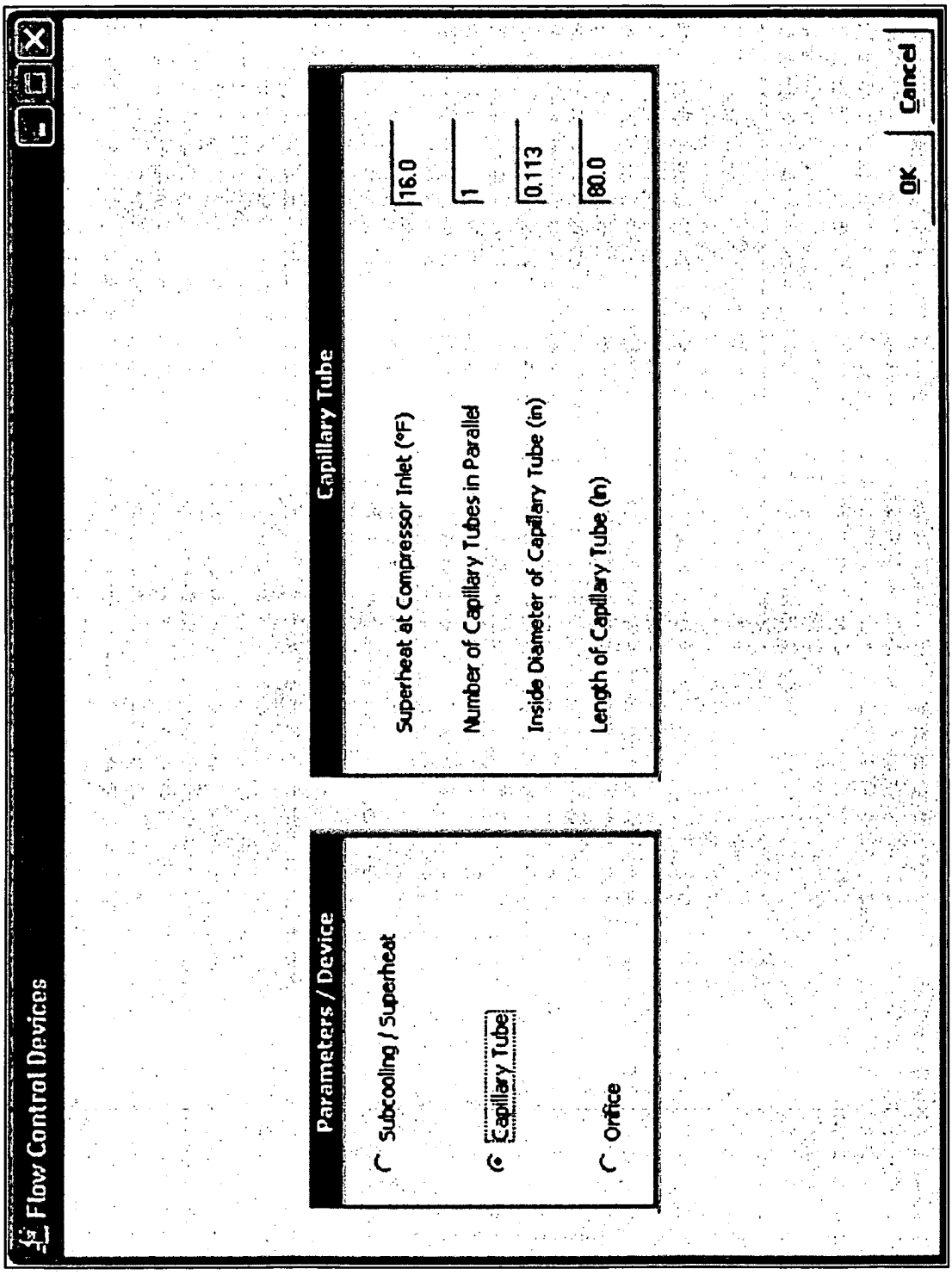

Flow Control Devices
Parameters / Device
Subcooling / Superheat
Capillary Tube
Orifice
Capillary Tube
Superheat at Compressor Inlet (°F)
16.0
Number of Capillary Tubes in Parallel
1
Inside Diameter of Capillary Tube (in)
0.113
Length of Capillary Tube (in)
80.0
OK
Cancel

FIG 7

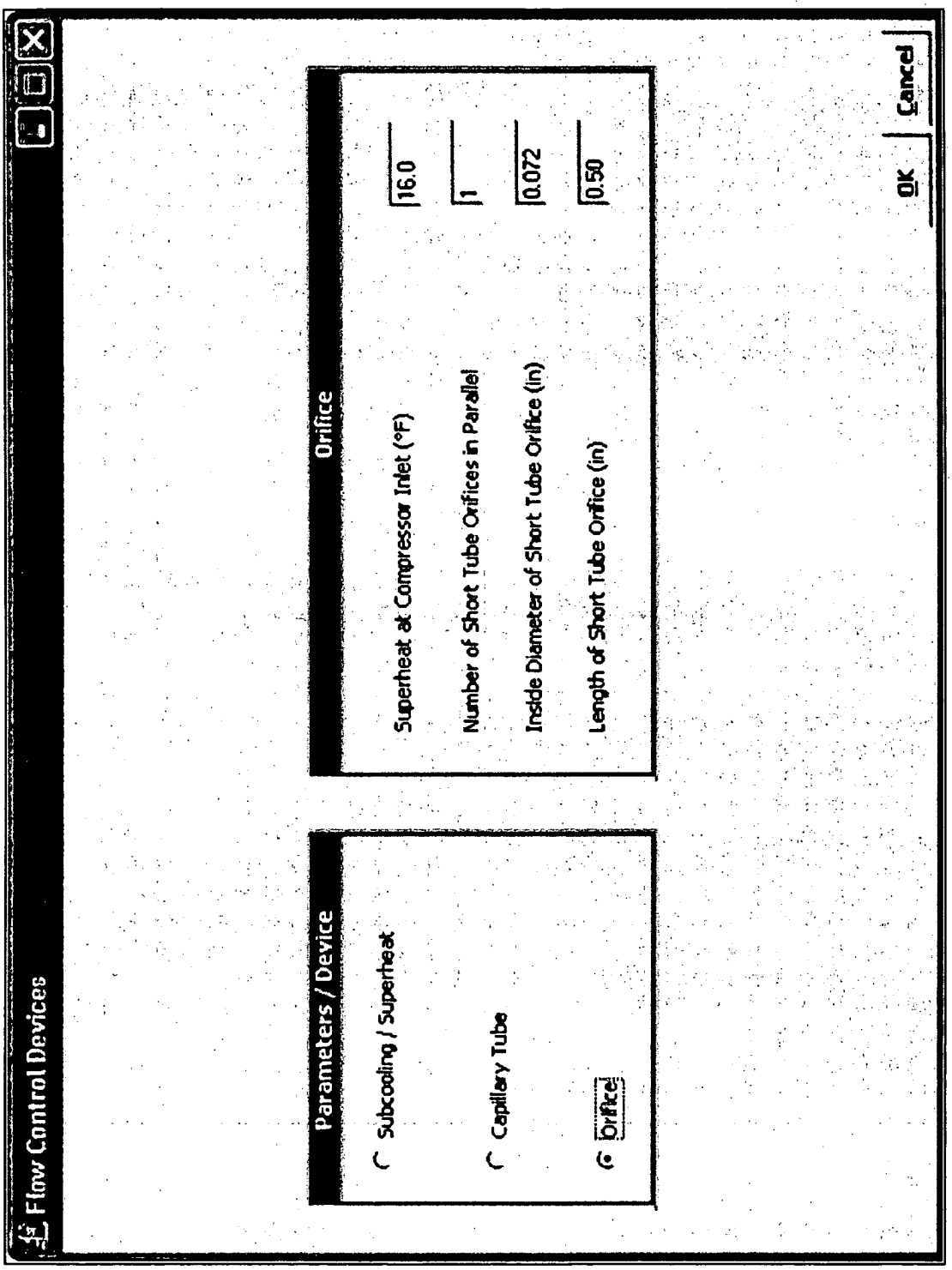

Flow Control Devices
Parameters / Device
Subcooling / Superheat
Capillary Tube
Orifice
Orifice
Superheat at Compressor Inlet (°F)
16.0
Number of Short Tube Orifices in Parallel
1
Inside Diameter of Short Tube Orifice (in)
0.072
Length of Short Tube Orifice (in)
0.50
OK
Cancel

FIG 8

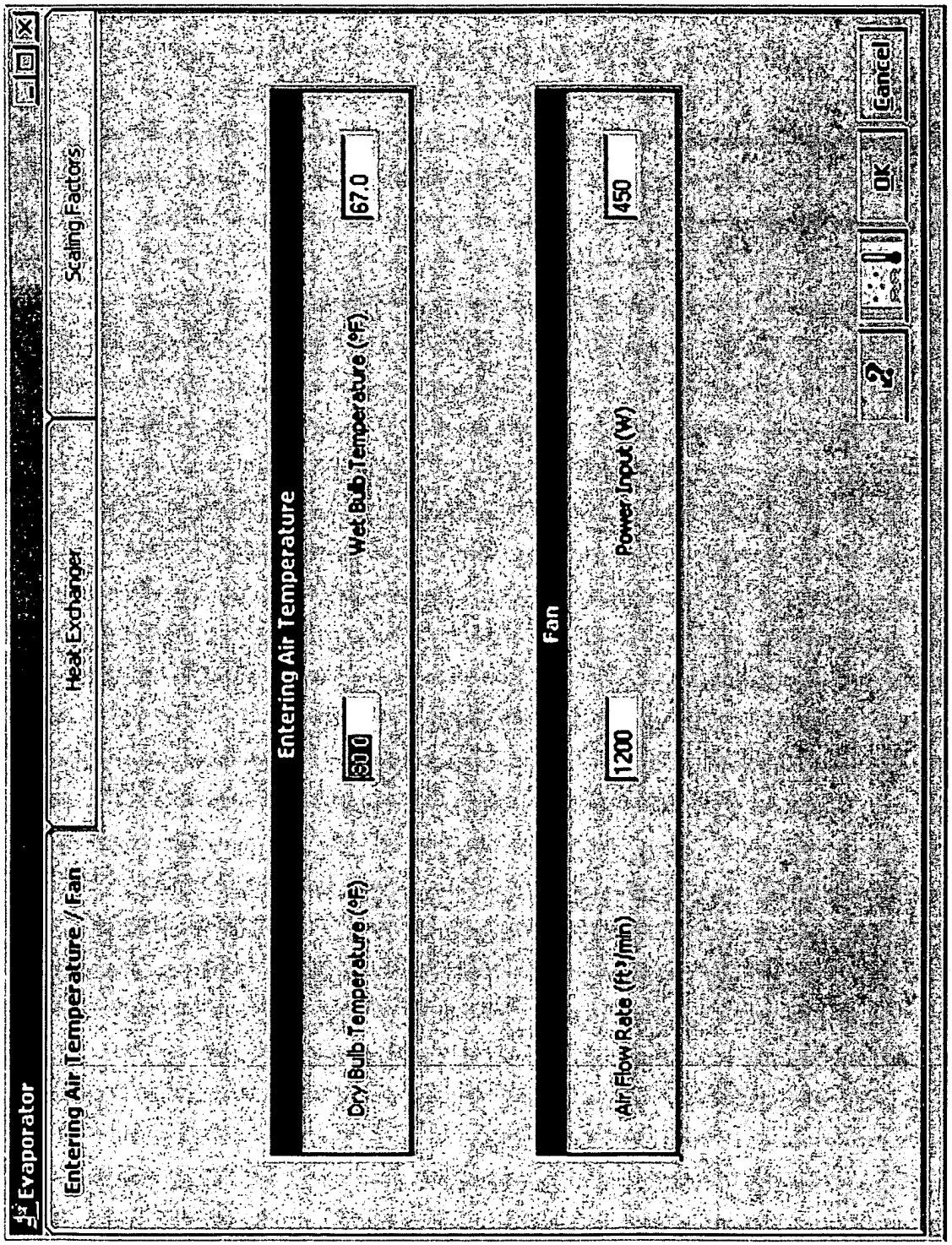

Evaporator
Entering Air Temperature / Fan
Heat Exchanger
Scaling Factors
Entering Air Temperature
Dry Bulb Temperature (°F)
80.0
Wet Bulb Temperature (°F)
67.0
Fan
Air Flow Rate (ft³/min)
1200
Power Input (W)
450
OK
Cancel

FIG 9

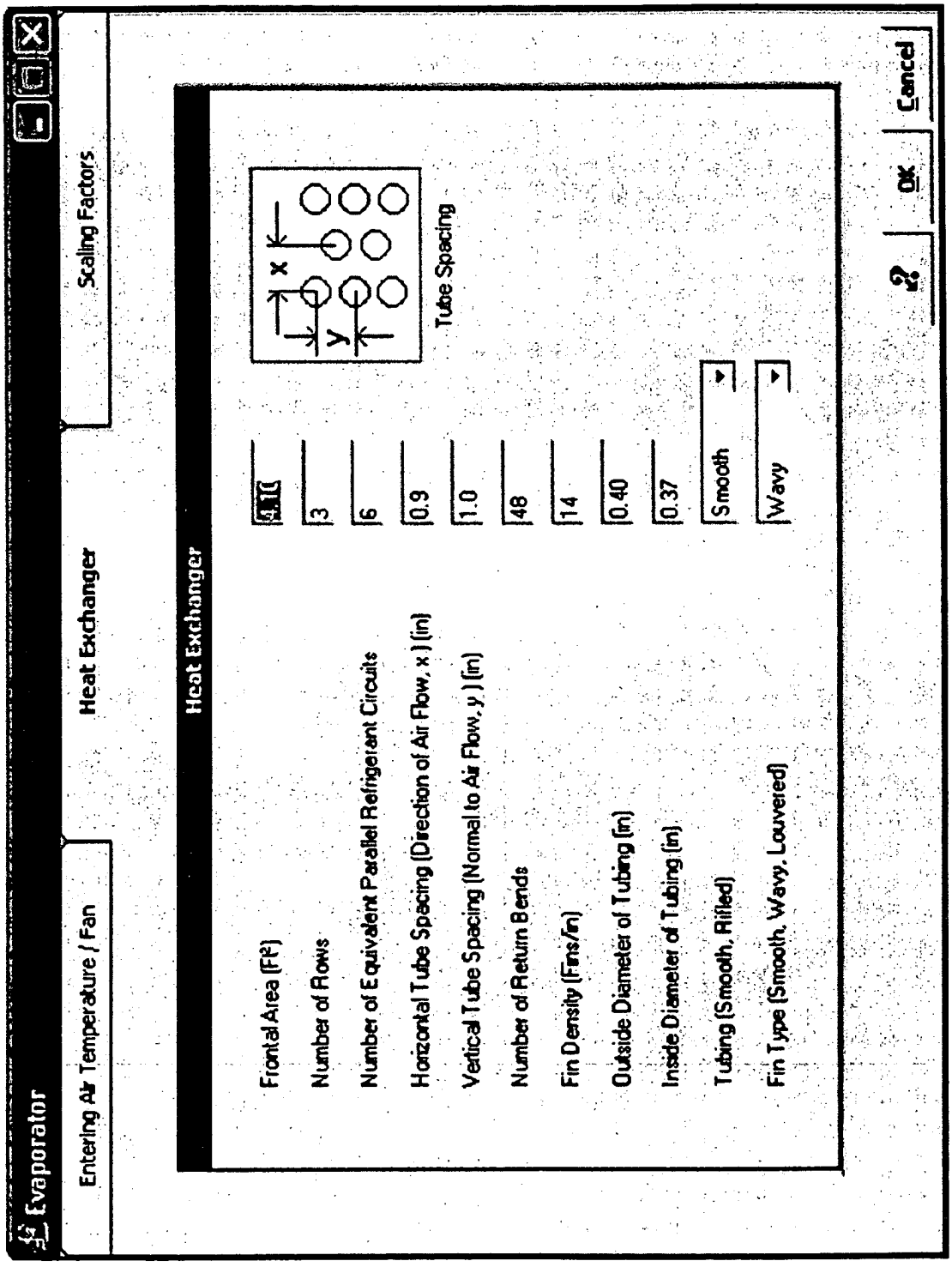

Evaporator
Entering Air Temperature / Fan
Heat Exchanger
Scaling Factors
Heat Exchanger
Frontal Area (Ft²)
Number of Rows
Number of Equivalent Parallel Refrigerant Circuits
Horizontal Tube Spacing (Direction of Air Flow, x) (in)
Vertical Tube Spacing (Normal to Air Flow, y) (in)
Number of Return Bends
Fin Density (Fins/in)
Outside Diameter of Tubing (in)
Inside Diameter of Tubing (in)
Tubing (Smooth, Rifled)
Fin Type (Smooth, Wavy, Louvered)
3
6
0.9
1.0
48
14
0.40
0.37
Smooth
Wavy
x
y
Tube Spacing
OK
Cancel

FIG 10

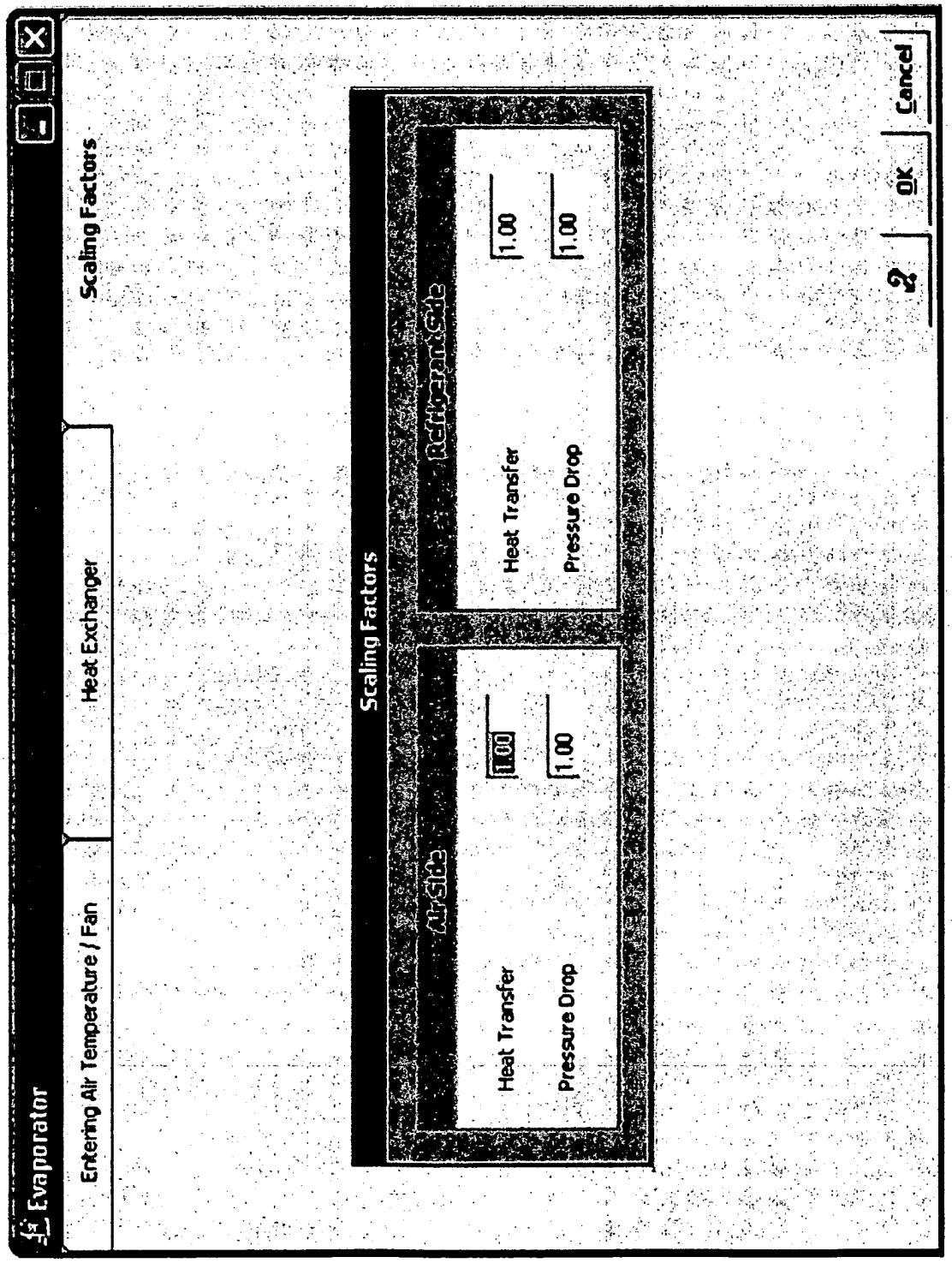

Evaporator
Entering Air Temperature / Fan
Heat Exchanger
Scaling Factors
Scaling Factors
Air Side
Heat Transfer
1.00
Pressure Drop
1.00
Refrigerant Side
Heat Transfer
1.00
Pressure Drop
1.00
OK
Cancel

FIG 11


Condenser
Entering Air Temperature // Fan
Heat Exchanger
Scaling Factors
Entering Air Temperature
Dry Bulb Temperature (°F)
95.0
Wet Bulb Temperature (°F)
75.0
Fan
Air Flow Rate (ft³/min)
2800
Power Input (W)
250
OK
Cancel

FIG 12

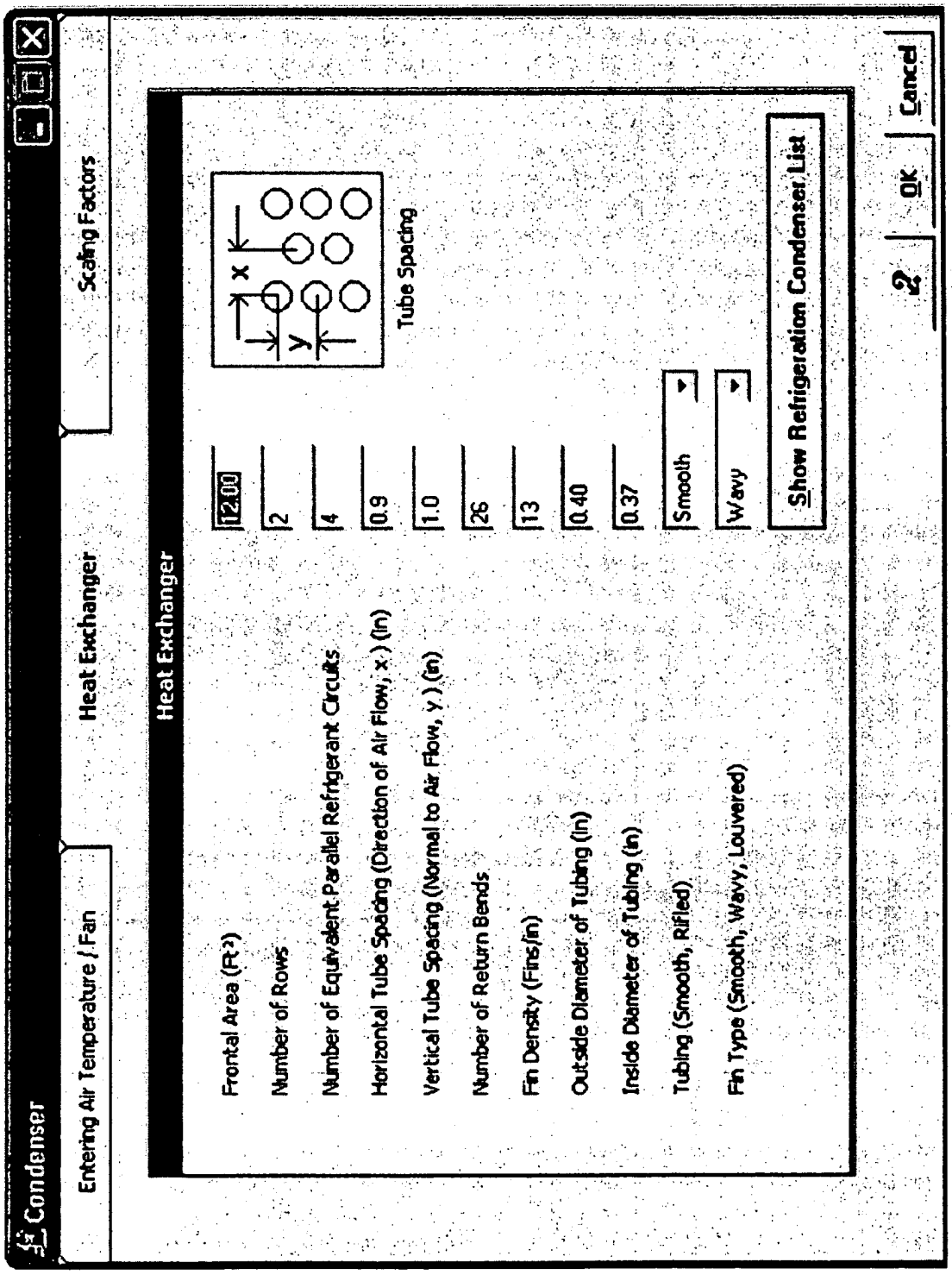

Condenser
Entering Air Temperature / Fan
Heat Exchanger
Scaling Factors
Heat Exchanger
Frontal Area (ft²)
12.00
Number of Rows
2
Number of Equivalent Parallel Refrigerant Circuits
4
Horizontal Tube Spacing (Direction of Air Flow, x) (in)
0.9
Vertical Tube Spacing (Normal to Air Flow, y) (in)
1.0
Number of Return Bends
26
Fin Density (Fins/in)
13
Outside Diameter of Tubing (in)
0.40
Inside Diameter of Tubing (in)
0.37
Tubing (Smooth, Rifled)
Smooth
Fin Type (Smooth, Wavy, Louvered)
Wavy
Show Refrigeration Condenser List
x
y
Tube Spacing
OK
Cancel

FIG 13

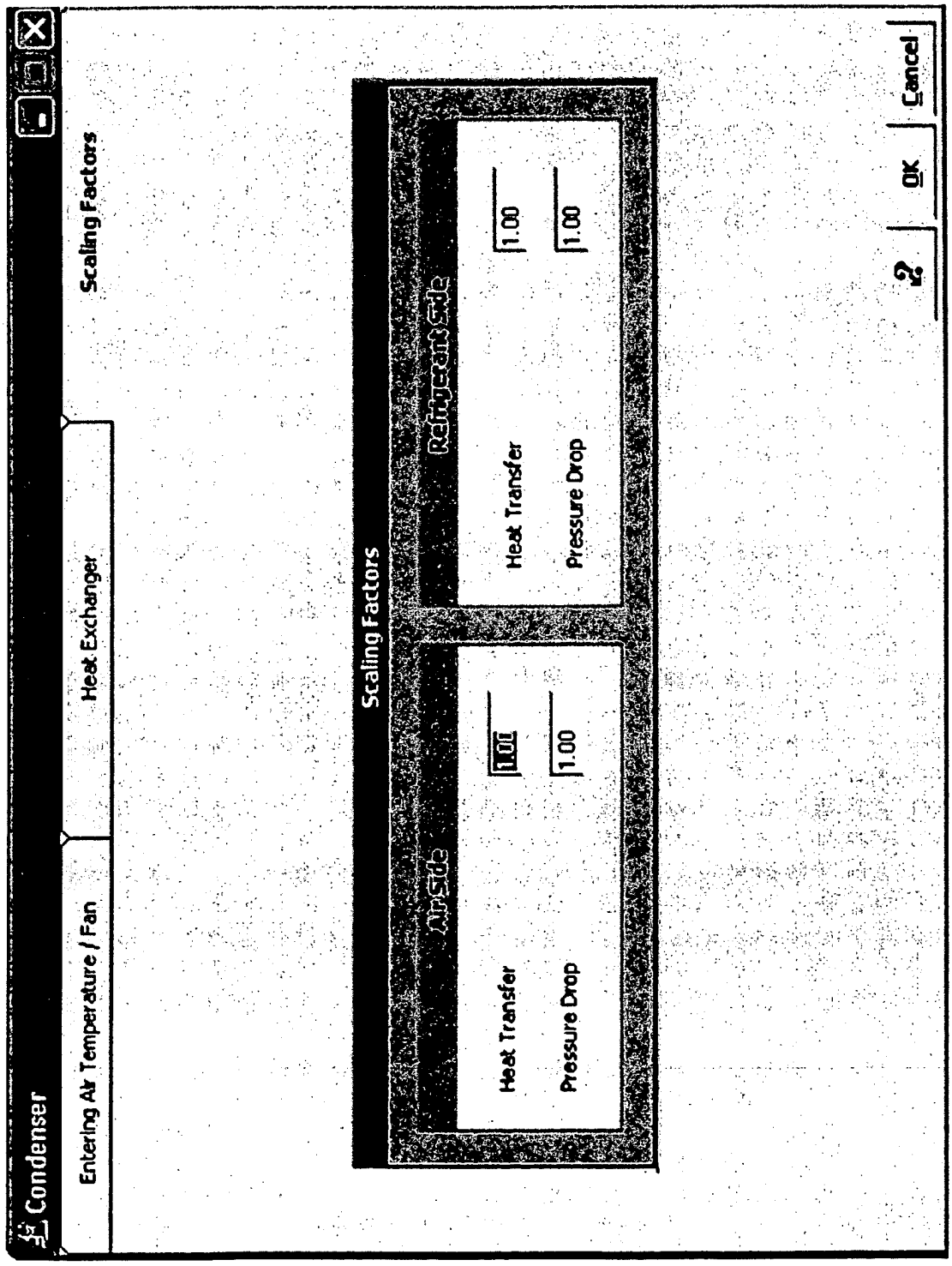

Condenser
Entering Air Temperature / Fan
Heat Exchanger
Scaling Factors
Scaling Factors
Air Side
Heat Transfer
1.00
Pressure Drop
1.00
Refrigerant Side
Heat Transfer
1.00
Pressure Drop
1.00
?
OK
Cancel

FIG 14

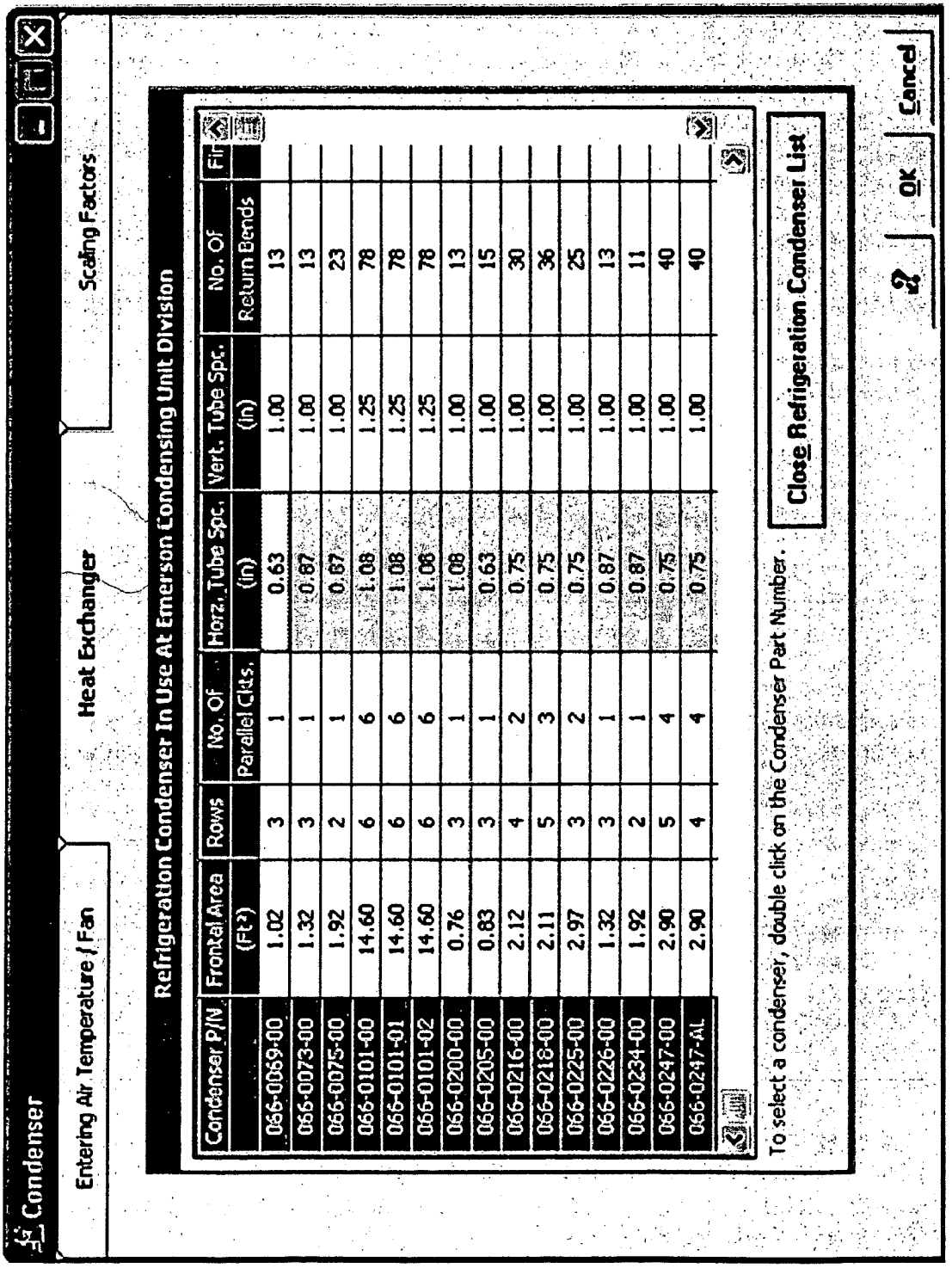

Condenser
Entering Air Temperature / Fan
Heat Exchanger
Sealing Factors
Refrigeration Condenser In Use At Emerson Condensing Unit Division
Condenser P/N
Frontal Area (Ft²)
Rows
No. Of Parallel Ckts.
Horz. Tube Spc. (in)
Vert. Tube Spc. (in)
No. Of Return Bends
066-0069-00 1.02 3 1 0.63 1.00 13
066-0073-00 1.32 3 1 0.87 1.00 13
066-0075-00 1.92 2 1 0.87 1.00 23
066-0101-00 14.60 6 6 1.08 1.25 78
066-0101-01 14.60 6 6 1.08 1.25 78
066-0101-02 14.60 6 6 1.08 1.25 78
066-0200-00 0.76 3 1 1.08 1.00 13
066-0205-00 0.83 3 1 0.63 1.00 15
066-0216-00 2.12 4 2 0.75 1.00 30
066-0218-00 2.11 5 3 0.75 1.00 36
066-0225-00 2.97 3 2 0.75 1.00 25
066-0226-00 1.32 3 1 0.87 1.00 13
066-0234-00 1.92 2 1 0.87 1.00 11
066-0247-00 2.90 5 4 0.75 1.00 40
066-0247-AL 2.90 4 4 0.75 1.00 40
To select a condenser, double click on the Condenser Part Number.
Close Refrigeration Condenser List
OK
Cancel

FIG 15

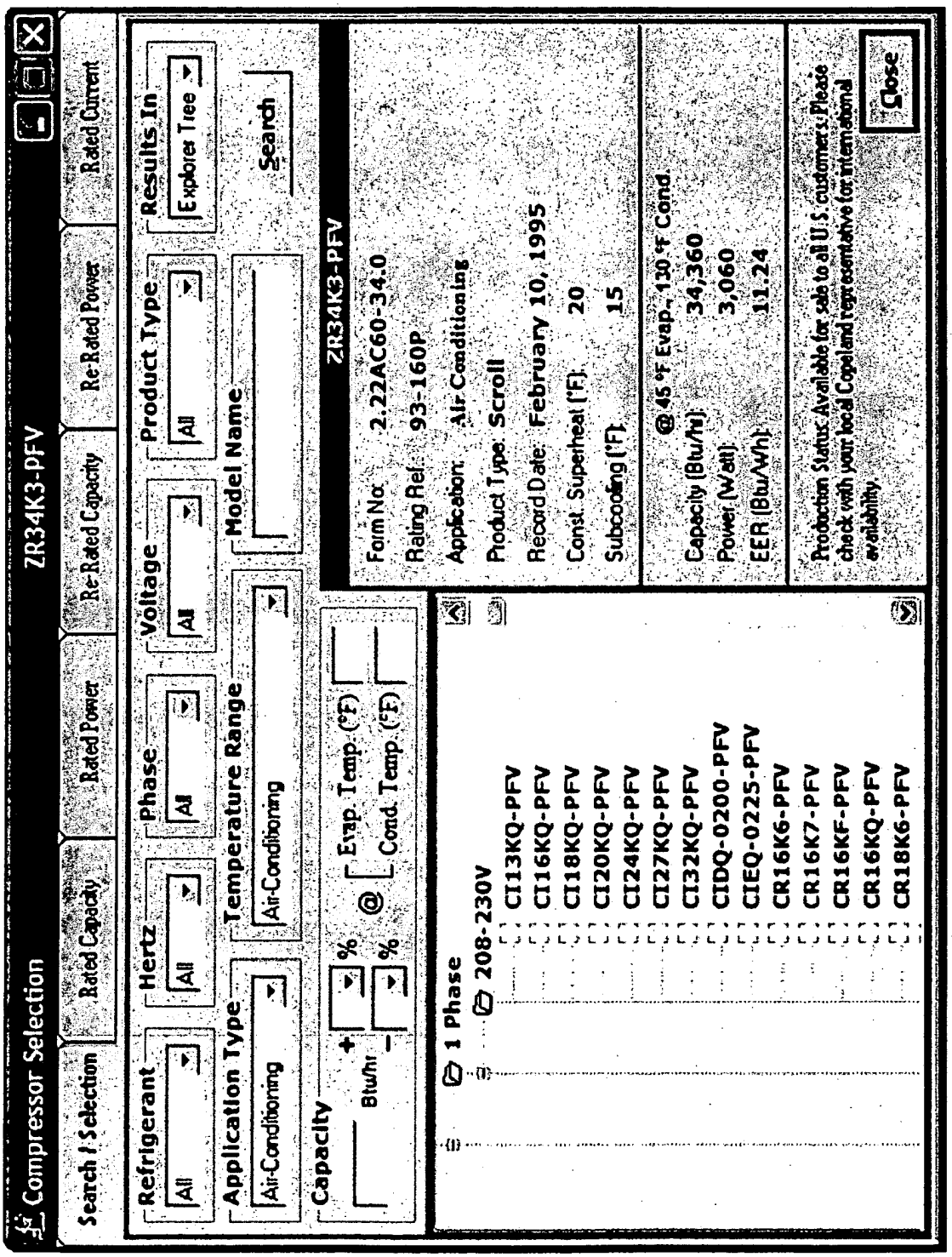

Compressor Selection
ZR34K3-PFV
Search / Selection
Rated Capacity
Rated Power
Re-Rated Capacity
Re-Rated Power
Rated Current
Refrigerant
All
Hertz
All
Phase
All
Voltage
All
Product Type
All
Results In
Explorer Tree
Application Type
Air-Conditioning
Temperature Range
Air-Conditioning
Model Name
Search
Capacity
Btu/hr
+
-
%
%
@
Evap. Temp. (°F)
Cond. Temp. (°F)
1 Phase
208-230V
CI13KQ-PFV
CI16KQ-PFV
CI18KQ-PFV
CI20KQ-PFV
CI24KQ-PFV
CI27KQ-PFV
CI32KQ-PFV
CIDQ-0200-PFV
CIEQ-0225-PFV
CR16K6-PFV
CR16K7-PFV
CR16KF-PFV
CR16KQ-PFV
CR18K6-PFV
ZR34K3-PFV
Form No. 2.22AC60-34.0
Rating Ref. 93-160P
Application: Air Conditioning
Product Type: Scroll
Record Date: February 10, 1995
Const. Superheat (°F) 20
Subcooling (°F) 15
@ 45 °F Evap., 130 °F Cond.
Capacity (Btu/hr) 34,360
Power (Watt) 3,060
EER (Btu/Wh) 11.24
Production Status: Available for sale to all U.S. customers. Please check with your local Copeland representative for international availability.
Close

FIG 16

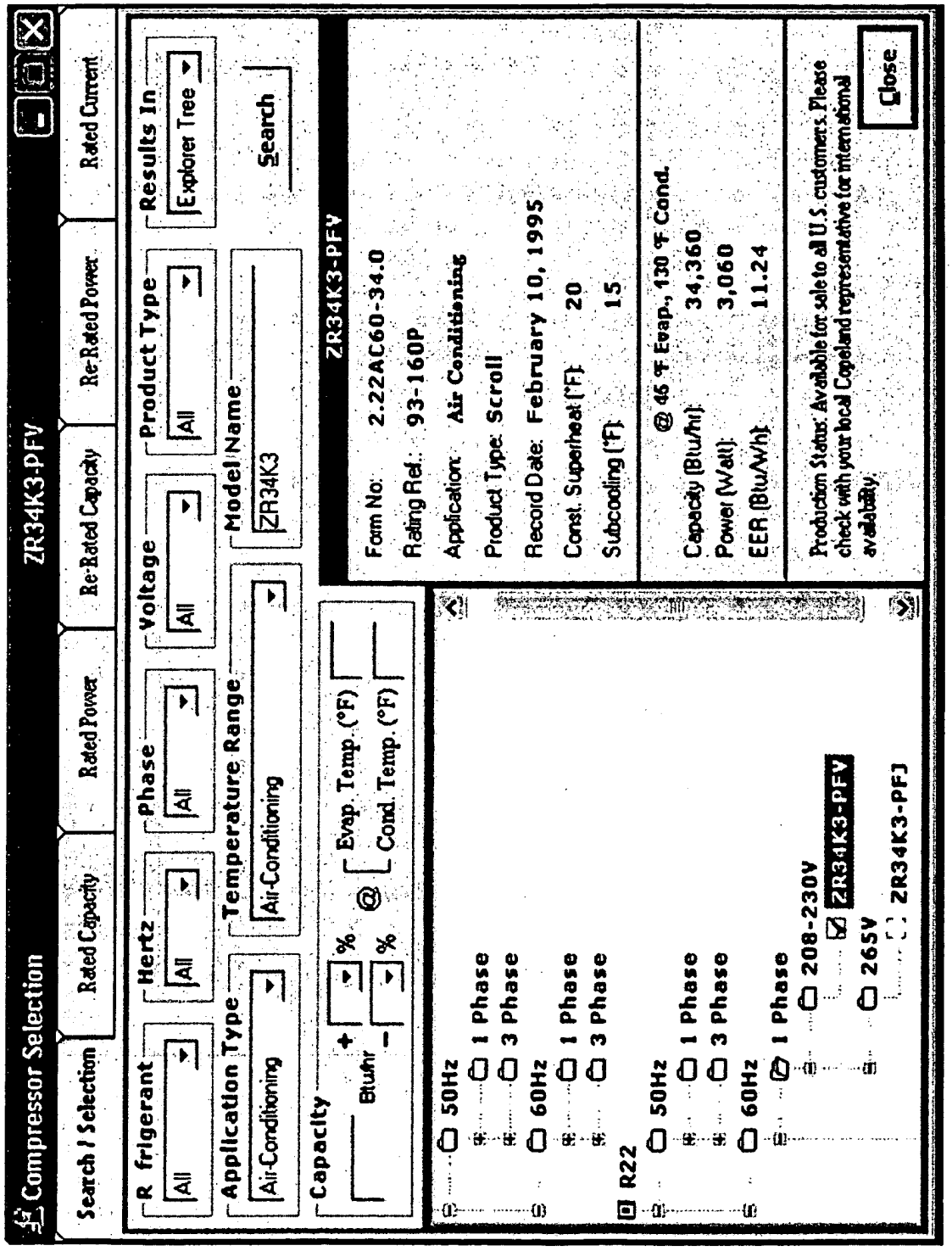

Compressor Selection
ZR34K3-PFV
Search / Selection
Rated Capacity
Rated Power
Re-Rated Capacity
Re-Rated Power
Rated Current
R frigerant
All
Hertz
All
Phase
All
Voltage
All
Product Type
All
Results In
Explorer Tree
Application Type
Air-Conditioning
Temperature Range
Air-Conditioning
Model Name
ZR34K3
Search
Capacity
Btu/hr
%
%
Evap. Temp. (°F)
Cond. Temp. (°F)
50Hz
1 Phase
3 Phase
60Hz
1 Phase
3 Phase
R22
50Hz
1 Phase
3 Phase
60Hz
1 Phase
208-230V
ZR34K3-PFV
265V
ZR34K3-PFJ
ZR34K3-PFV
Form No: 2.22AC60-34.0
Rating Ref.: 93-160P
Application: Air Conditioning
Product Type: Scroll
Record Date: February 10, 1995
Const. Superheat (°F): 20
Subcooling (°F): 15
@ 45 °F Evap., 130 °F Cond.
Capacity (Btu/hr): 34,360
Power (Watt): 3,060
EER (Btu/W/h): 11.24
Production Status: Available for sale to all U.S. customers. Please check with your local Copeland representative for international availability.
Close

FIG 17

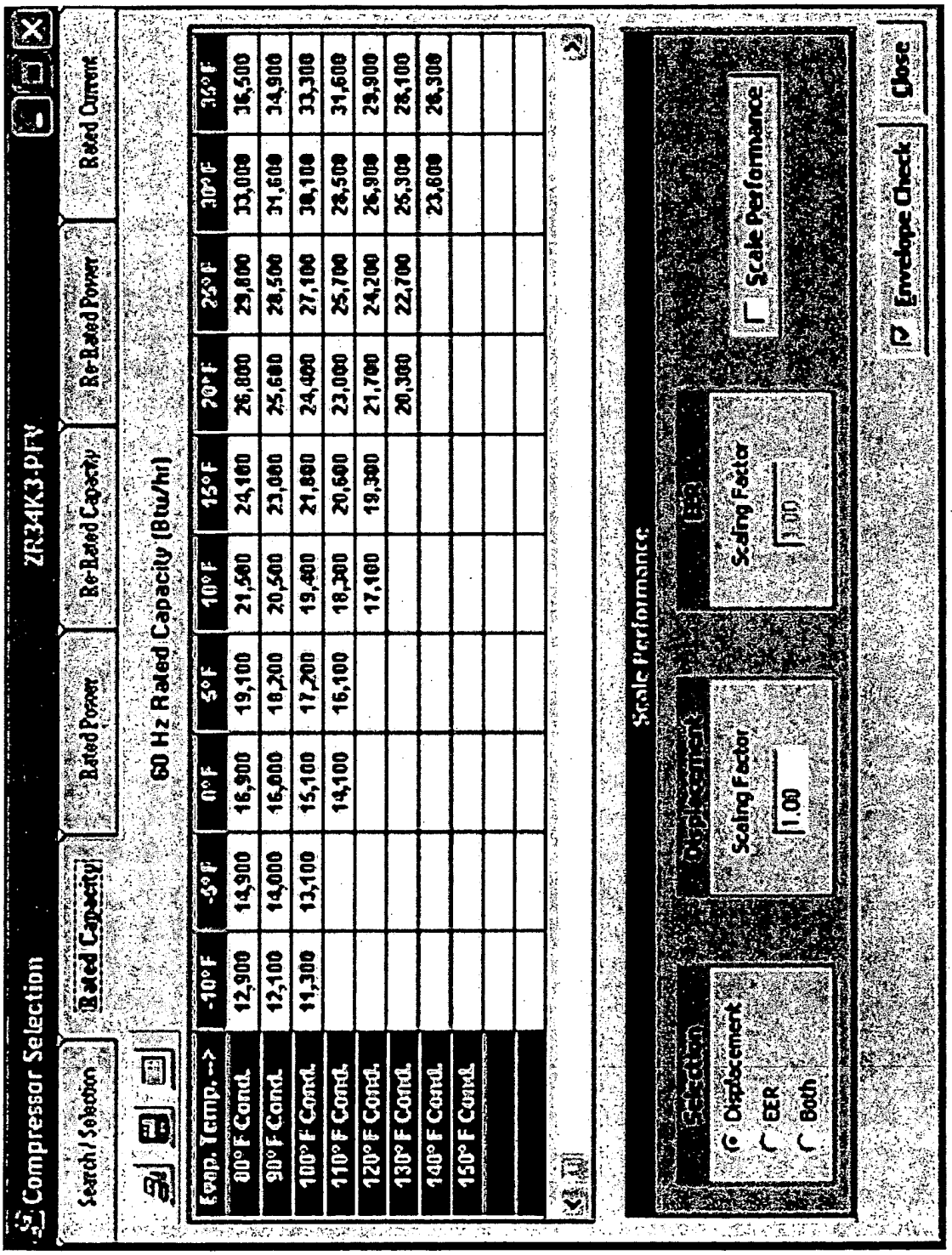

Compressor Selection
ZR34K3-PFV
Search / Selection
Rated Capacity
Rated Power
Re-Rated Capacity
Re-Rated Power
Rated Current
60 Hz Rated Capacity (Btu/hr)
Evap. Temp. -->
-10°F
-5°F
0°F
5°F
10°F
15°F
20°F
25°F
30°F
35°F
80° F Cond.
90° F Cond.
100° F Cond.
110° F Cond.
120° F Cond.
130° F Cond.
140° F Cond.
150° F Cond.
12,900 14,900 16,900 19,100 21,500 24,100 26,800 29,800 33,000 36,500
12,100 14,000 16,000 18,200 20,500 23,000 25,600 28,500 31,600 34,900
11,300 13,100 15,100 17,200 19,400 21,800 24,400 27,100 30,100 33,300
14,100 16,100 18,200 20,500 23,000 25,700 28,500 31,600
17,100 19,300 21,700 24,200 26,900 29,900
20,300 22,700 25,300 28,100
23,600 26,300
Scale Performance
Selection
Displacement
EER
Both
Scaling Factor
1.00
Displacement
Scaling Factor
1.00
Scale Performance
Envelope Check
Close

FIG 18

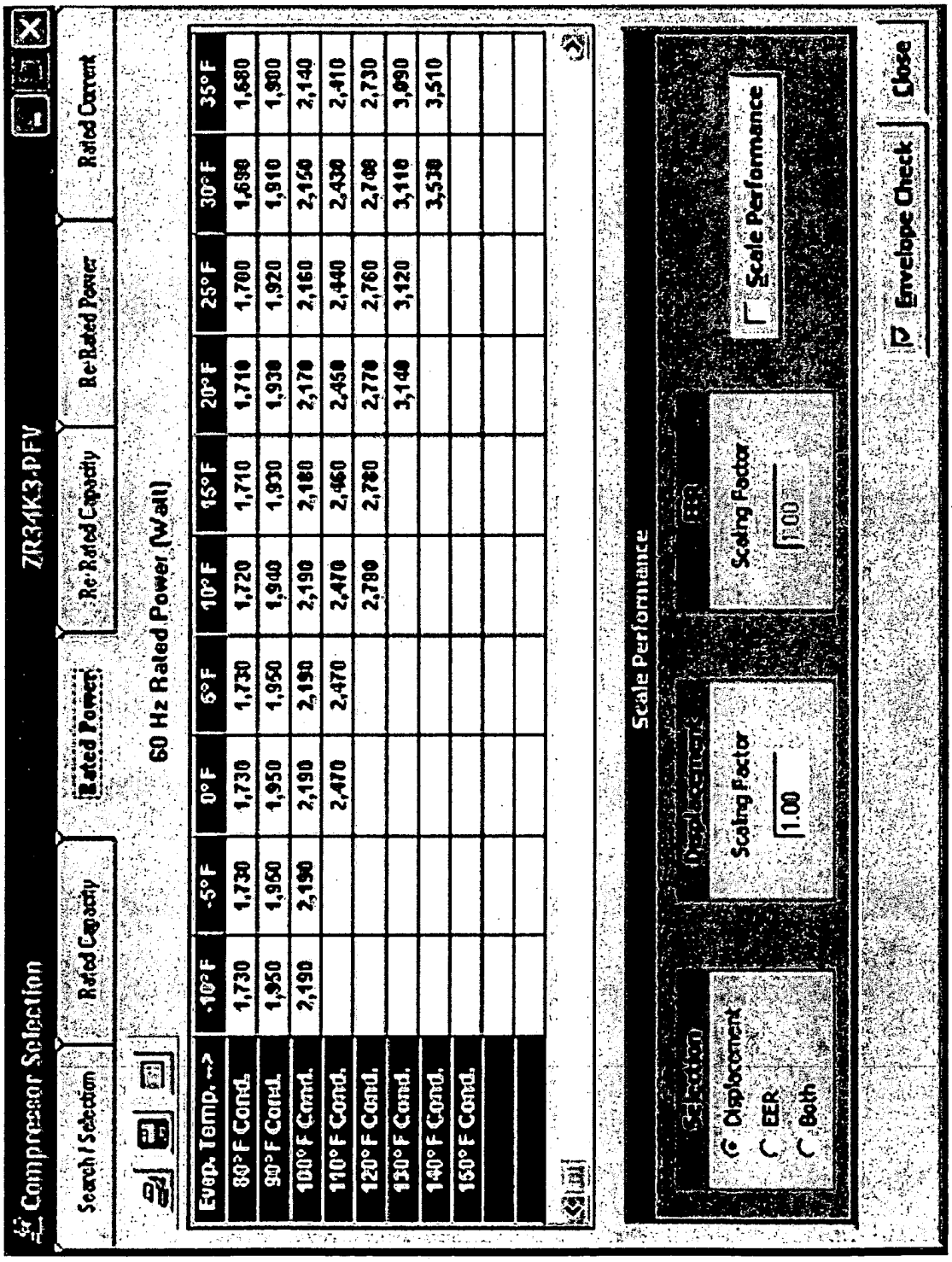

Compressor Selection
ZR34K3-PFV
Search / Selection
Rated Capacity
Rated Power
Re-Rated Capacity
Re-Rated Power
Rated Current
60 Hz Rated Power (Watt)
Evap. Temp. -->
-10°F
-5°F
0°F
5°F
10°F
15°F
20°F
25°F
30°F
35°F
80°F Cond.
1,730
1,730
1,730
1,730
1,720
1,710
1,710
1,700
1,690
1,680
90°F Cond.
1,950
1,950
1,950
1,950
1,940
1,930
1,930
1,920
1,910
1,900
100°F Cond.
2,190
2,190
2,190
2,190
2,190
2,180
2,170
2,160
2,150
2,140
110°F Cond.
2,470
2,470
2,470
2,470
2,460
2,450
2,440
2,430
2,410
120°F Cond.
2,780
2,780
2,780
2,770
2,760
2,740
2,730
130°F Cond.
3,140
3,120
3,110
3,090
140°F Cond.
3,530
3,510
150°F Cond.
Scale Performance
Displacement
EER
Both
Scaling Factor
1.00
Scale Performance
Envelope Check
Close

FIG 19

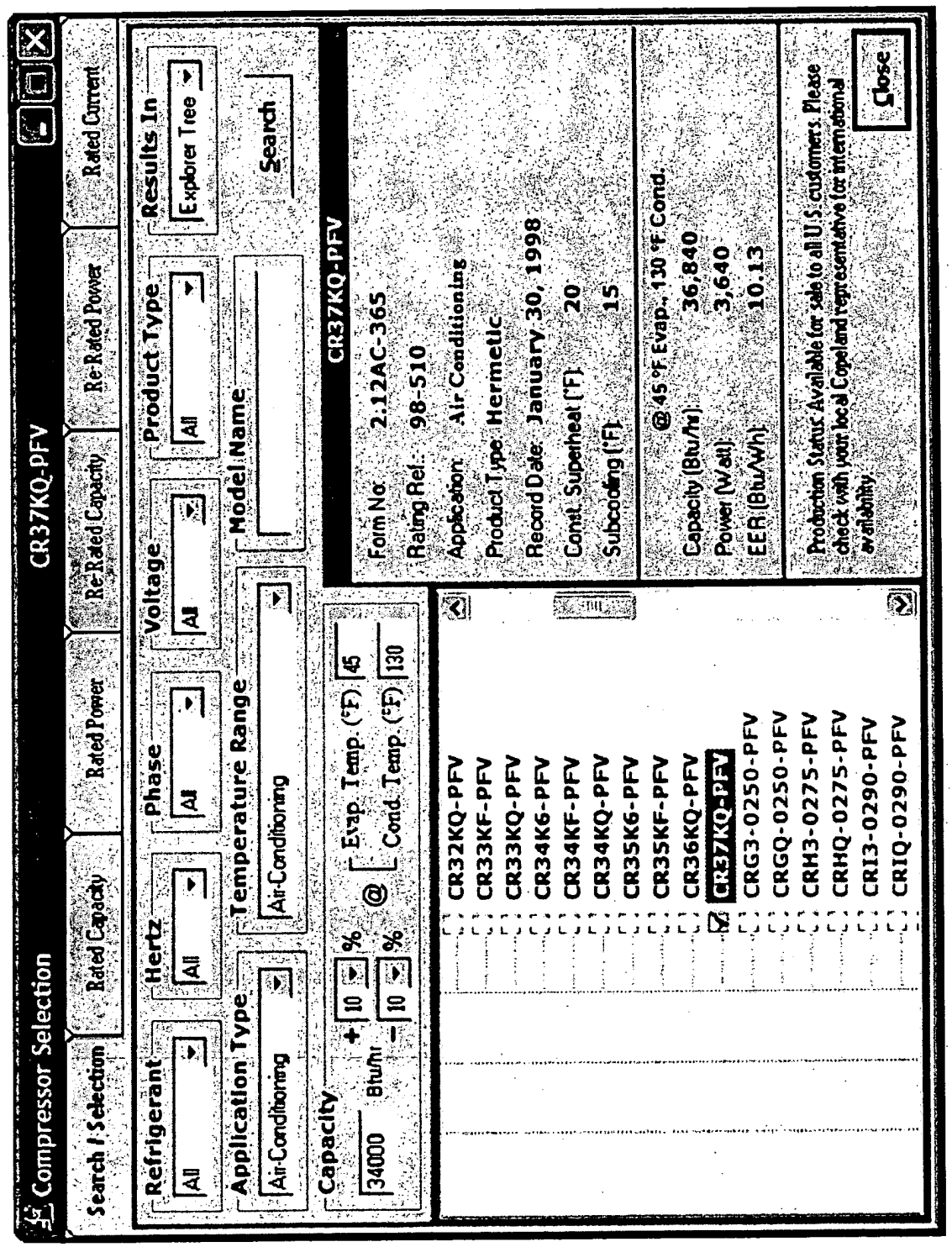

Compressor Selection
CR37KQ-PFV
Search / Selection
Rated Capacity
Rated Power
Re-Rated Capacity
Re-Rated Power
Rated Current
Refrigerant
All
Hertz
All
Phase
All
Voltage
All
Product Type
All
Results In
Explorer Tree
Application Type
Air-Conditioning
Temperature Range
Air-Conditioning
Model Name
Search
Capacity
34000 Btu/hr
+ 10 %
- 10 %
@
Evap. Temp. (°F) 45
Cond. Temp. (°F) 130
CR32KQ-PFV
CR33KF-PFV
CR33KQ-PFV
CR34K6-PFV
CR34KF-PFV
CR34KQ-PFV
CR35K6-PFV
CR35KF-PFV
CR36KQ-PFV
CR37KQ-PFV
CRG3-0250-PFV
CRGQ-0250-PFV
CRH3-0275-PFV
CRHQ-0275-PFV
CRI3-0290-PFV
CRIQ-0290-PFV
CR37KQ-PFV
Form No. 2.12AC-365
Rating Ref.: 98-510
Application: Air Conditioning
Product Type: Hermetic
Record Date: January 30, 1998
Const. Superheat (°F) 20
Subcooling (°F) 15
@ 45 °F Evap., 130 °F Cond.
Capacity (Btu/hr) 36,840
Power (Watt) 3,640
EER (Btu/Wh) 10.13
Production Status: Available for sale to all U.S. customers. Please check with your local Copeland representative for international availability.
Close

FIG 20

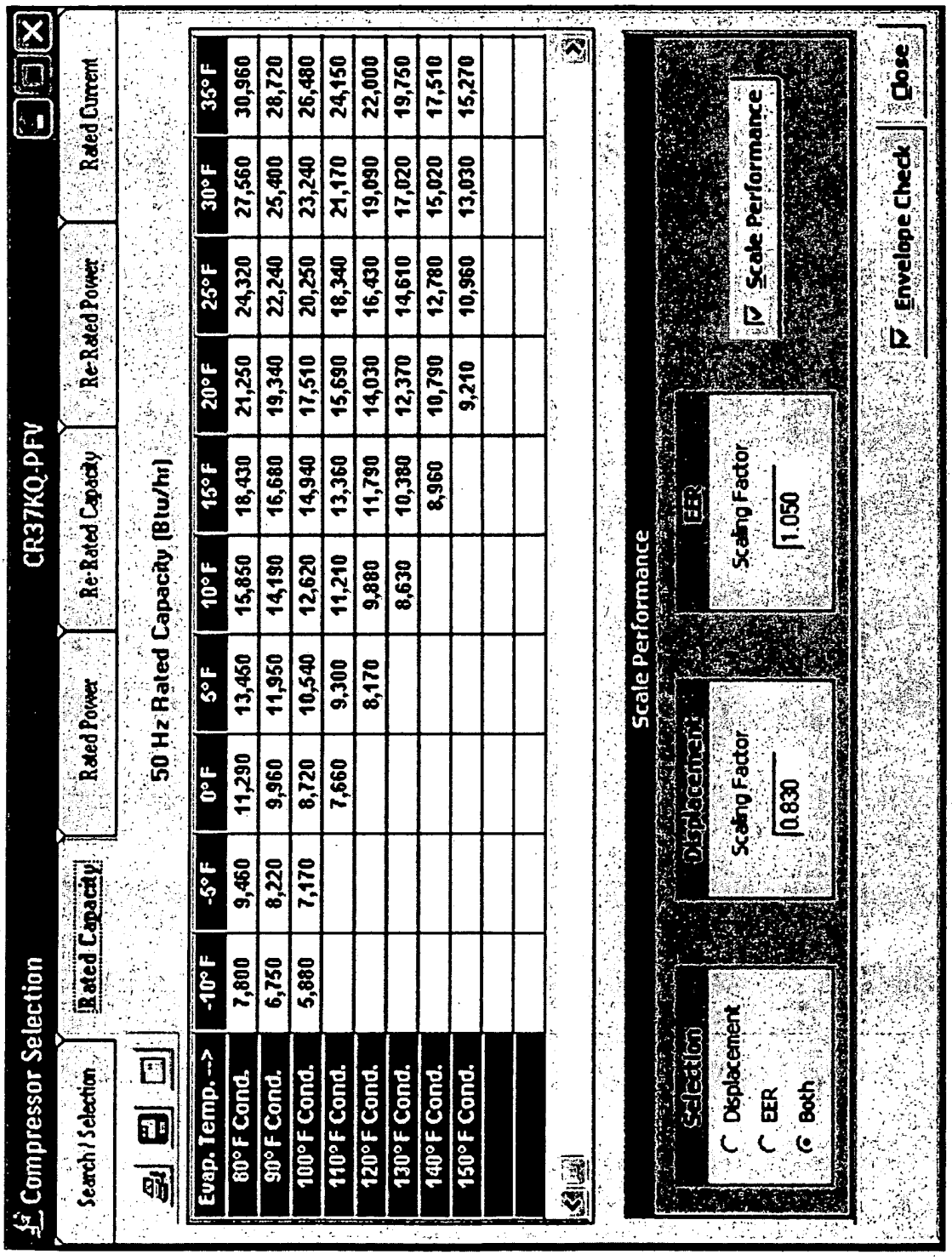

Compressor Selection
CR37K0.PFV
Search / Selection
Rated Capacity
Rated Power
Re-Rated Capacity
Re-Rated Power
Rated Current
50 Hz Rated Capacity (Btu/hr)
Evap. Temp. -->
-10°F
-5°F
0°F
5°F
10°F
15°F
20°F
25°F
30°F
35°F
80° F Cond.
7,800
9,460
11,290
13,450
15,850
18,430
21,250
24,320
27,560
30,960
90° F Cond.
6,750
8,220
9,960
11,950
14,190
16,680
19,340
22,240
25,400
28,720
100° F Cond.
5,880
7,170
8,720
10,540
12,620
14,940
17,510
20,250
23,240
26,480
110° F Cond.
7,660
9,300
11,210
13,360
15,690
18,340
21,170
24,150
120° F Cond.
8,170
9,880
11,790
14,030
16,430
19,090
22,000
130° F Cond.
8,630
10,380
12,370
14,610
17,020
19,750
140° F Cond.
8,960
10,790
12,780
15,020
17,510
150° F Cond.
9,210
10,960
13,030
15,270
Scale Performance
Selection
Displacement
EER
Both
Displacement
Scaling Factor
0.830
EER
Scaling Factor
1.050
Scale Performance
Envelope Check
Close

FIG 21

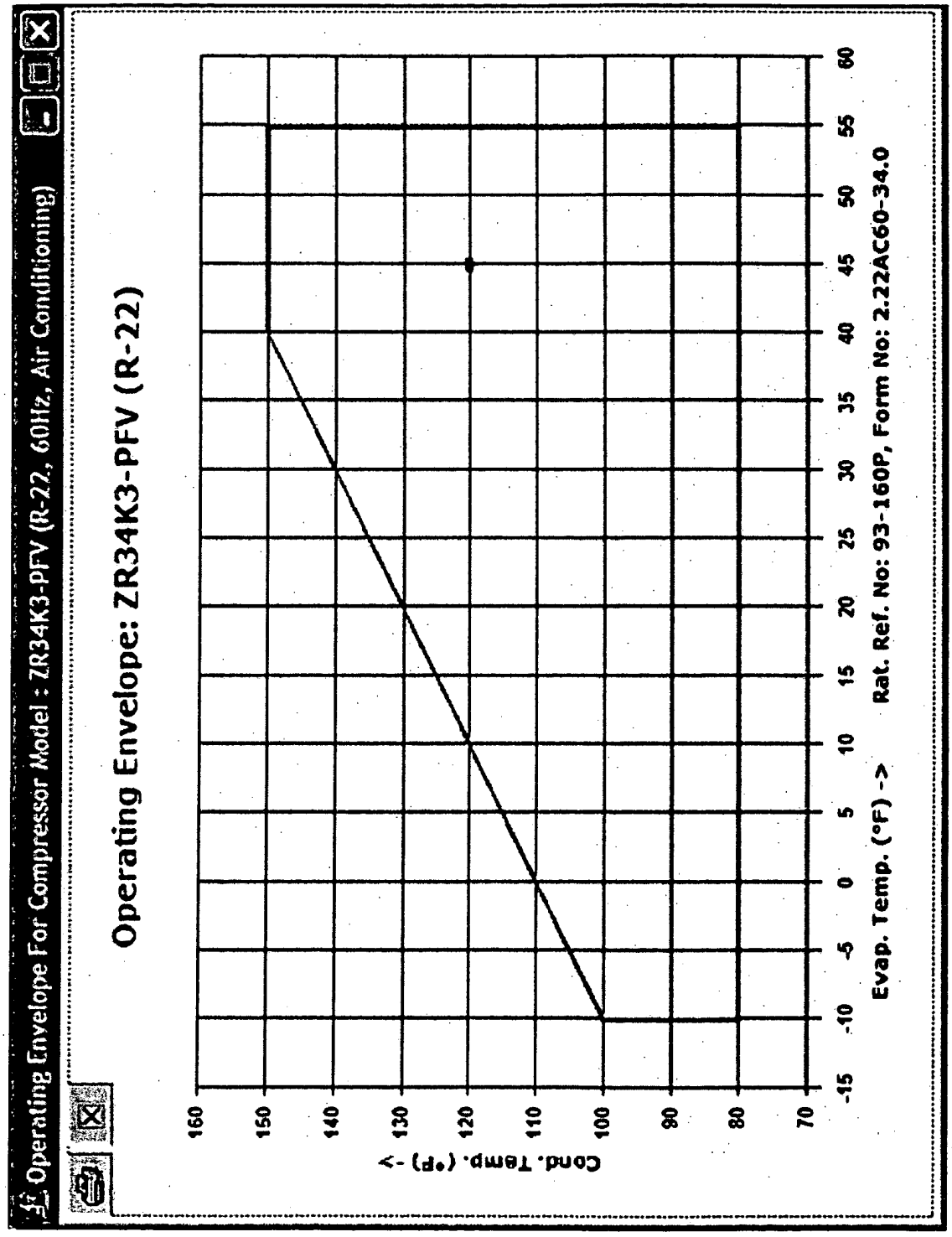

Operating Envelope For Compressor Model : ZR34K3-PFV (R-22, 60Hz, Air Conditioning)
Operating Envelope: ZR34K3-PFV (R-22)
Cond. Temp. (°F) ->
160
150
140
130
120
110
100
90
80
70
-15
-10
-5
0
5
10
15
20
25
30
35
40
45
50
55
60
Evap. Temp. (°F) ->
Rat. Ref. No: 93-160P, Form No: 2.22AC60-34.0

FIG 22

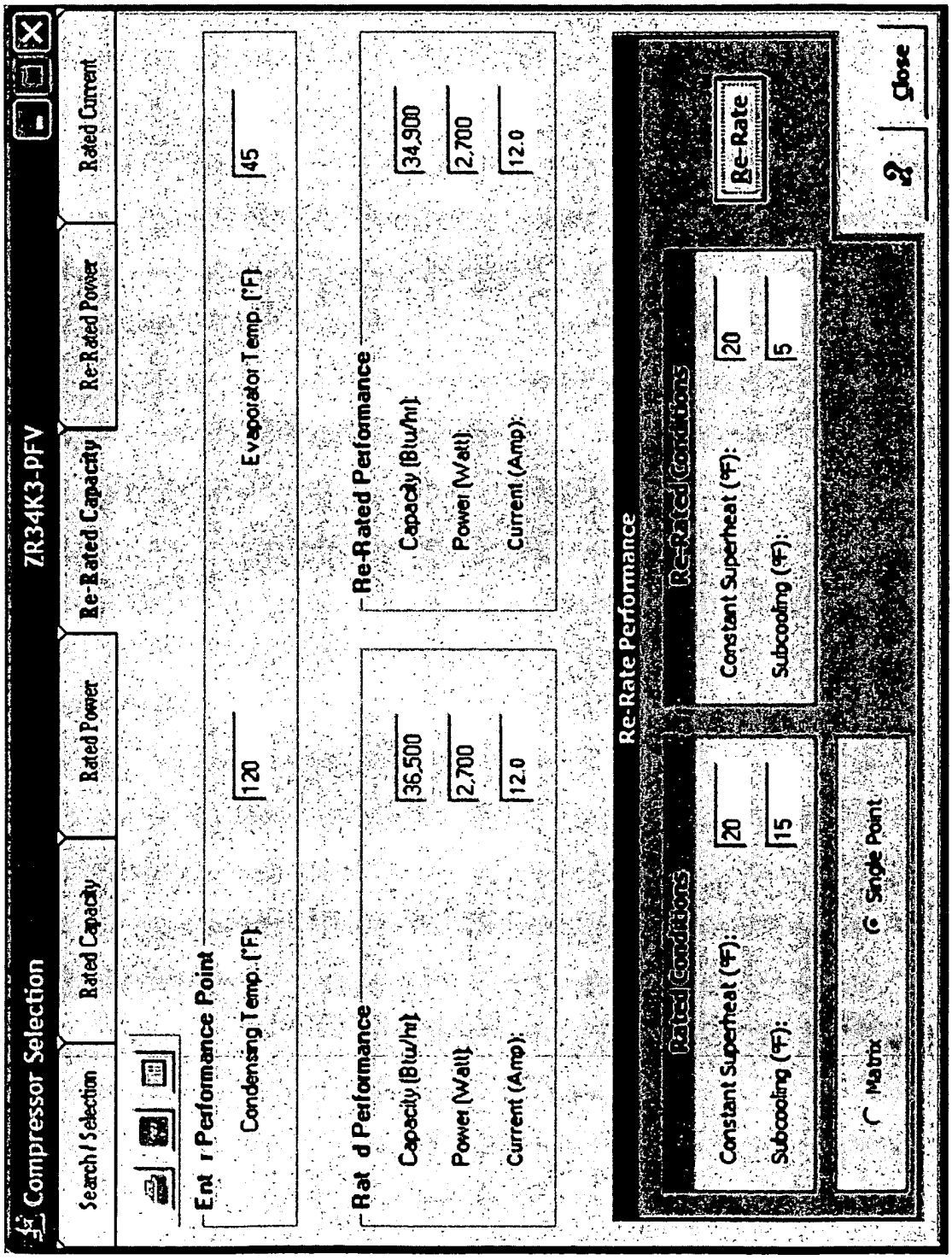

Compressor Selection
ZR34K3-PFV
Search / Selection
Rated Capacity
Rated Power
Re-Rated Capacity
Re-Rated Power
Rated Current
Enter Performance Point
Condensing Temp. (°F)
120
Evaporator Temp. (°F)
45
Rated Performance
Capacity (Btu/hr)
36,500
Power (Watt)
2,700
Current (Amp):
12.0
Re-Rated Performance
Capacity (Btu/hr)
34,900
Power (Watt)
2,700
Current (Amp):
12.0
Re-Rate Performance
Rated Conditions
Constant Superheat (°F):
20
Subcooling (°F):
15
Re-Rated Conditions
Constant Superheat (°F):
20
Subcooling (°F):
5
Re-Rate
Matrix
Single Point
Close

FIG 23

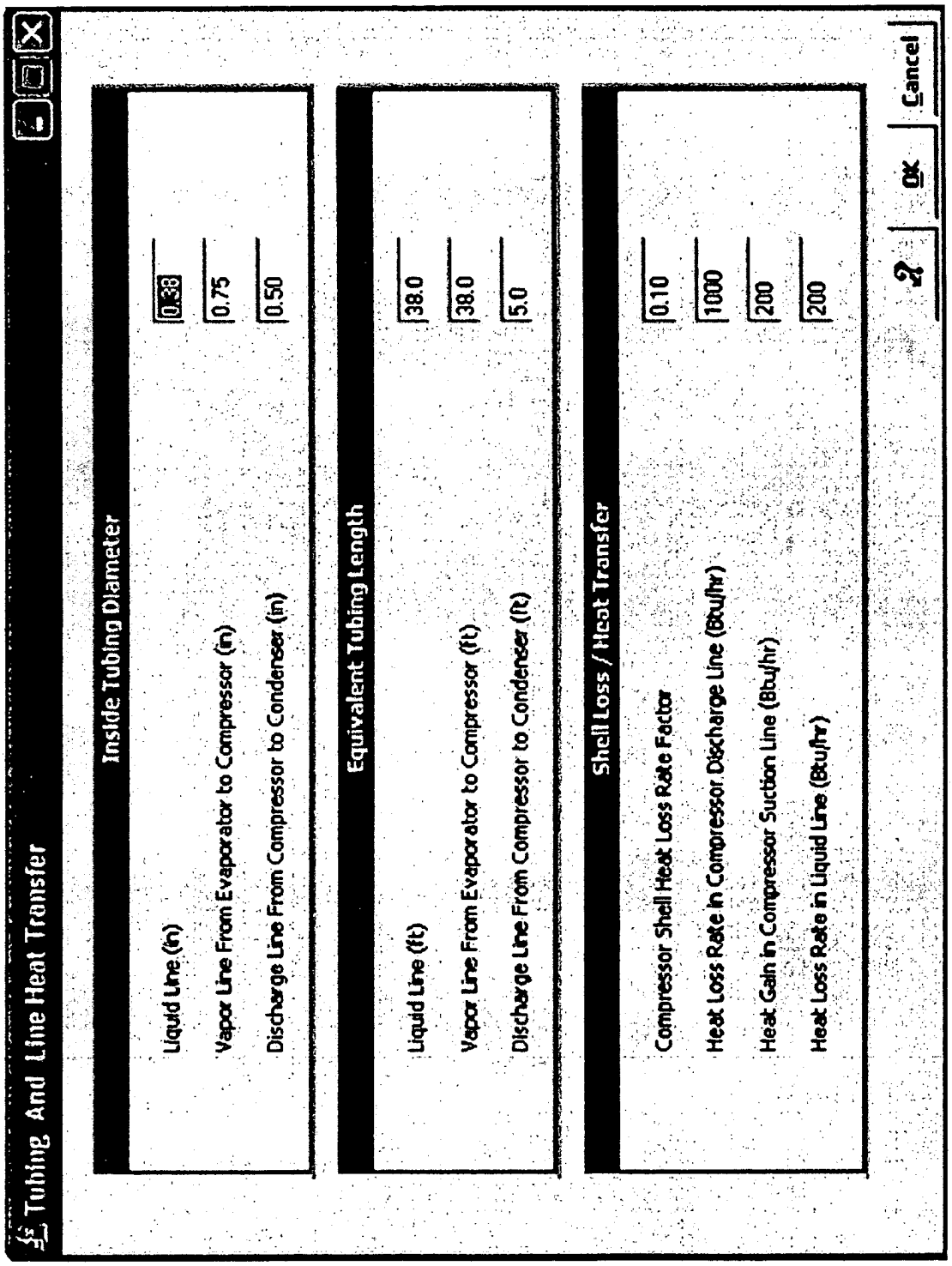

Tubing And Line Heat Transfer
Inside Tubing Diameter
Liquid Line (in)
0.38
Vapor Line From Evaporator to Compressor (in)
0.75
Discharge Line From Compressor to Condenser (in)
0.50
Equivalent Tubing Length
Liquid Line (ft)
38.0
Vapor Line From Evaporator to Compressor (ft)
38.0
Discharge Line From Compressor to Condenser (ft)
5.0
Shell Loss / Heat Transfer
Compressor Shell Heat Loss Rate Factor
0.10
Heat Loss Rate in Compressor Discharge Line (Btu/hr)
1000
Heat Gain in Compressor Suction Line (Btu/hr)
200
Heat Loss Rate in Liquid Line (Btu/hr)
200
OK
Cancel

FIG 24

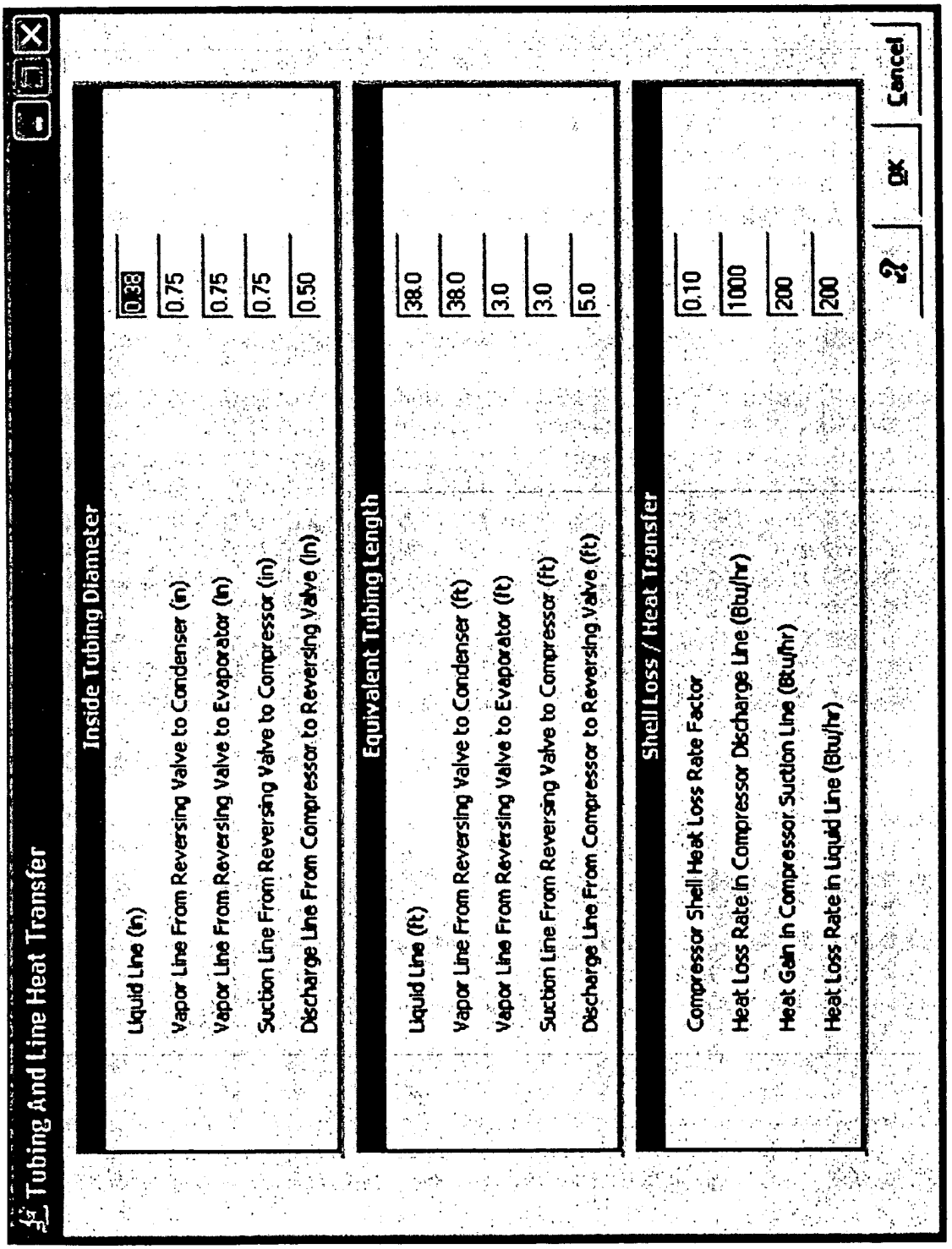
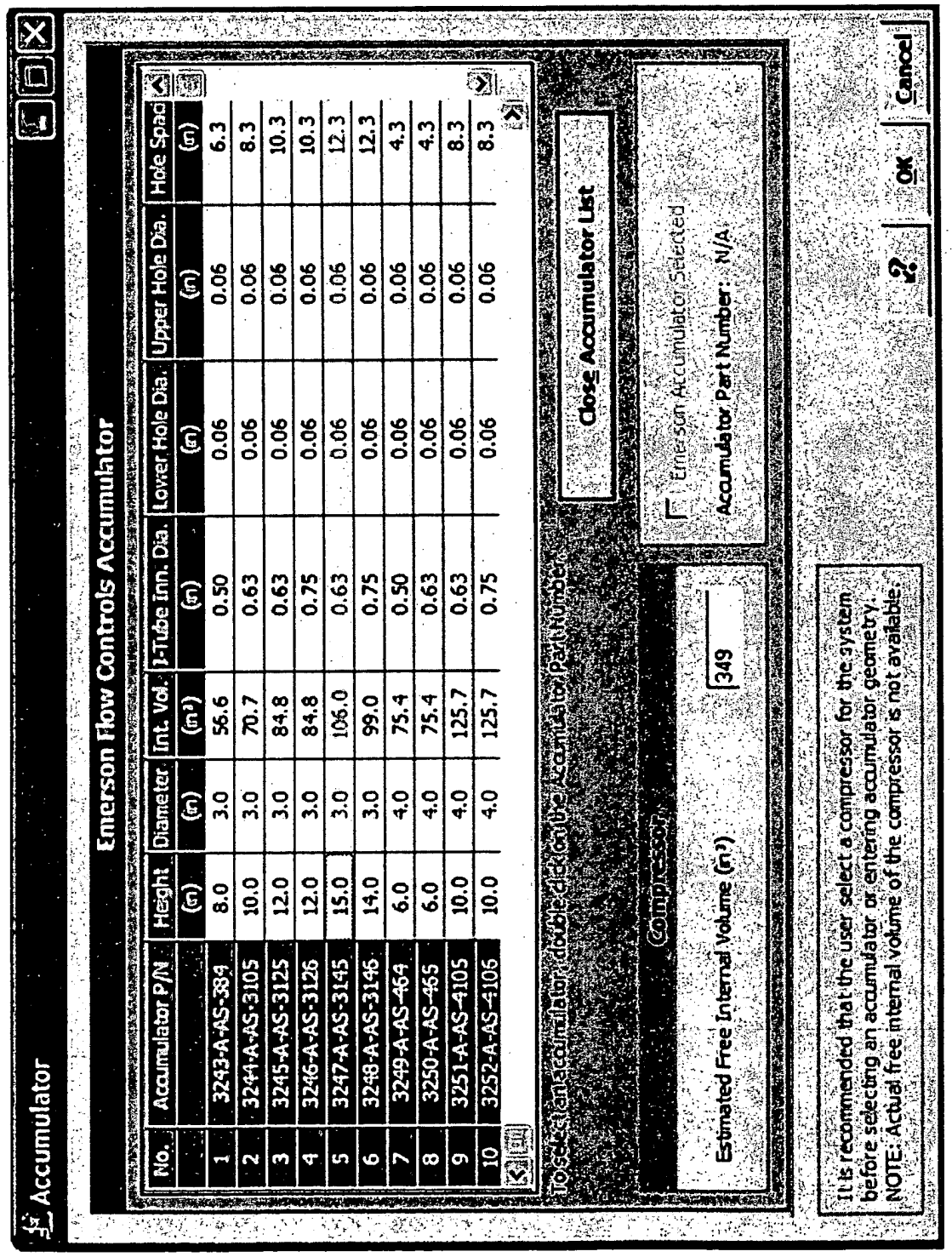

Tubing And Line Heat Transfer
Inside Tubing Diameter
Liquid Line (in)
0.38
Vapor Line From Reversing Valve to Condenser (in)
0.75
Vapor Line From Reversing Valve to Evaporator (in)
0.75
Suction Line From Reversing Valve to Compressor (in)
0.75
Discharge Line From Compressor to Reversing Valve (in)
0.50
Equivalent Tubing Length
Liquid Line (ft)
38.0
Vapor Line From Reversing Valve to Condenser (ft)
38.0
Vapor Line From Reversing Valve to Evaporator (ft)
3.0
Suction Line From Reversing Valve to Compressor (ft)
3.0
Discharge Line From Compressor to Reversing Valve (ft)
5.0
Shell Loss / Heat Transfer
Compressor Shell Heat Loss Rate Factor
0.10
Heat Loss Rate in Compressor Discharge Line (Btu/hr)
1000
Heat Gain in Compressor Suction Line (Btu/hr)
200
Heat Loss Rate in Liquid Line (Btu/hr)
200
OK
Cancel

FIG 25



No.	Accumulator P/N	Height (in)	Diameter (in)	Int. Vol. (in³)	I-Tube Inn. Dia. (in)	Lower Hole Dia. (in)	Upper Hole Dia. (in)	Hole Spac (in)
1	3243-A-AS-384	8.0	3.0	56.6	0.50	0.06	0.06	6.3
2	3244-A-AS-3105	10.0	3.0	70.7	0.63	0.06	0.06	8.3
3	3245-A-AS-3125	12.0	3.0	84.8	0.63	0.06	0.06	10.3
4	3246-A-AS-3126	12.0	3.0	84.8	0.75	0.06	0.06	10.3
5	3247-A-AS-3145	15.0	3.0	106.0	0.63	0.06	0.06	12.3
6	3248-A-AS-3146	14.0	3.0	99.0	0.75	0.06	0.06	12.3
7	3249-A-AS-464	6.0	4.0	75.4	0.50	0.06	0.06	4.3
8	3250-A-AS-465	6.0	4.0	75.4	0.63	0.06	0.06	4.3
9	3251-A-AS-4105	10.0	4.0	125.7	0.63	0.06	0.06	8.3
10	3252-A-AS-4106	10.0	4.0	125.7	0.75	0.06	0.06	8.3

FIG 26

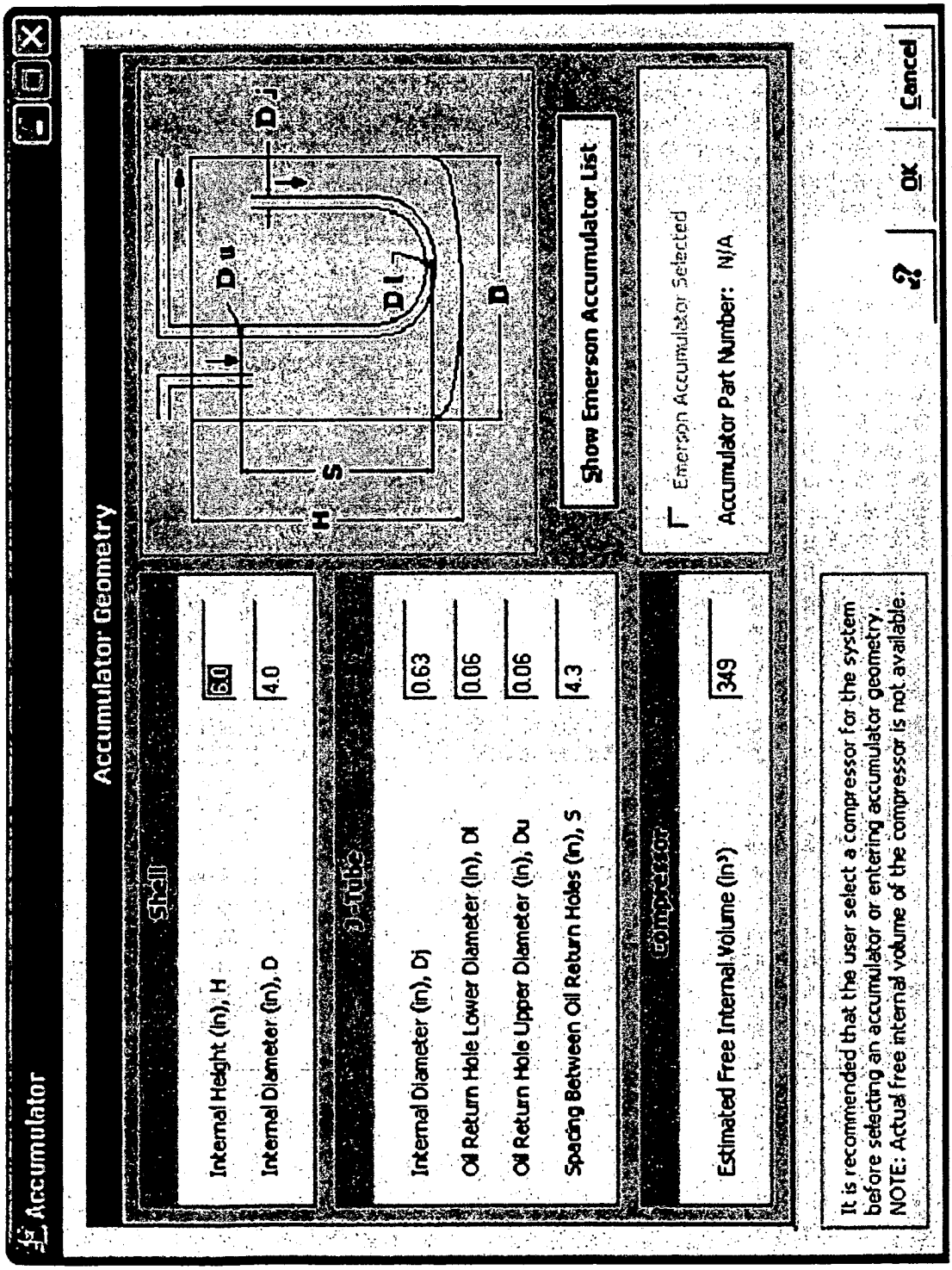

Accumulator
Accumulator Geometry
Shell
Internal Height (in), H
6.0
Internal Diameter (in), D
4.0
J-Tube
Internal Diameter (in), Dj
0.63
Oil Return Hole Lower Diameter (in), Dl
0.06
Oil Return Hole Upper Diameter (in), Du
0.06
Spacing Between Oil Return Holes (in), S
4.3
Compressor
Estimated Free Internal Volume (in³)
349
Du
Dj
Dl
H
S
B
Show Emerson Accumulator List
Emerson Accumulator Selected
Accumulator Part Number: N/A
It is recommended that the user select a compressor for the system before selecting an accumulator or entering accumulator geometry.
NOTE: Actual free internal volume of the compressor is not available.
?
OK
Cancel

FIG 27

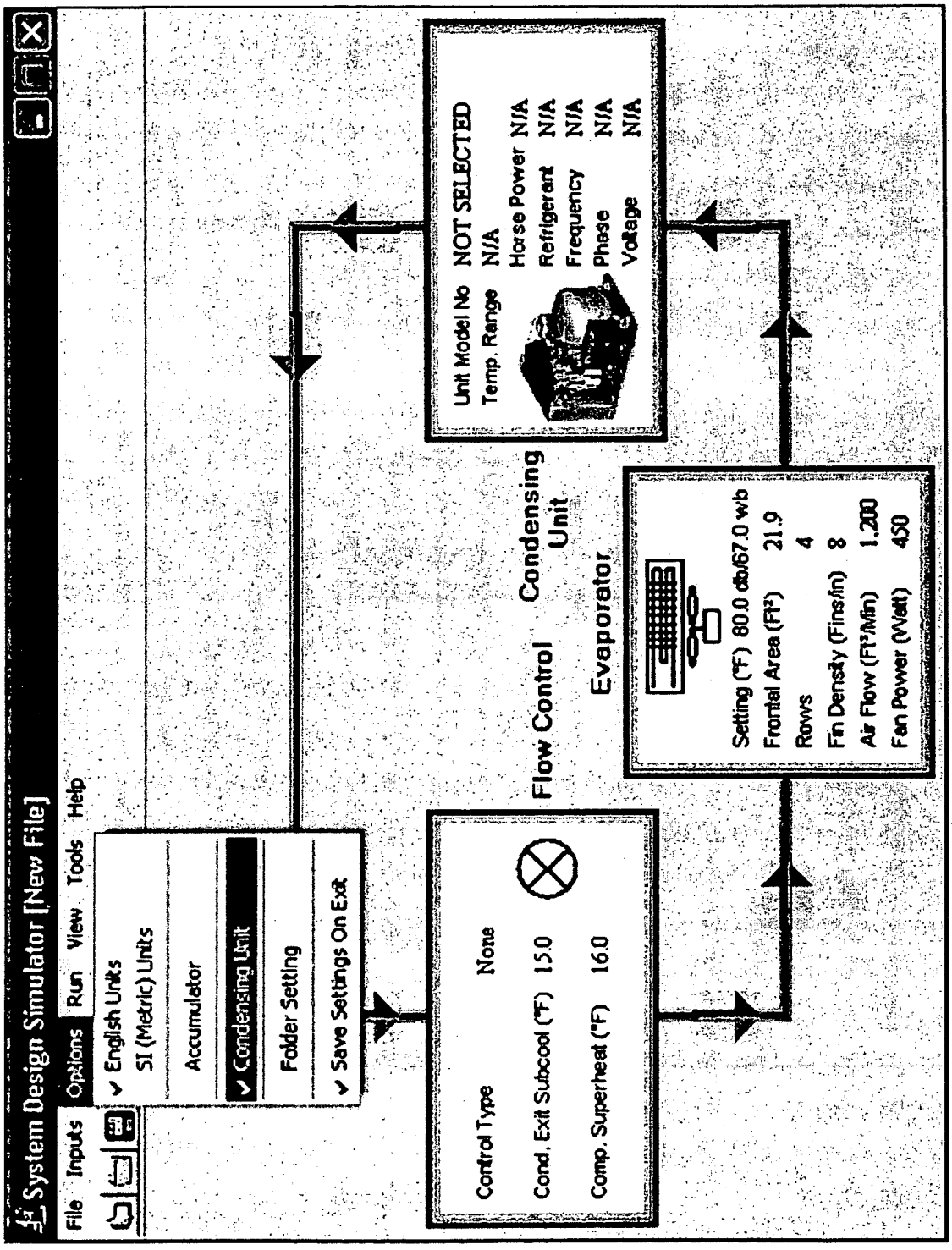
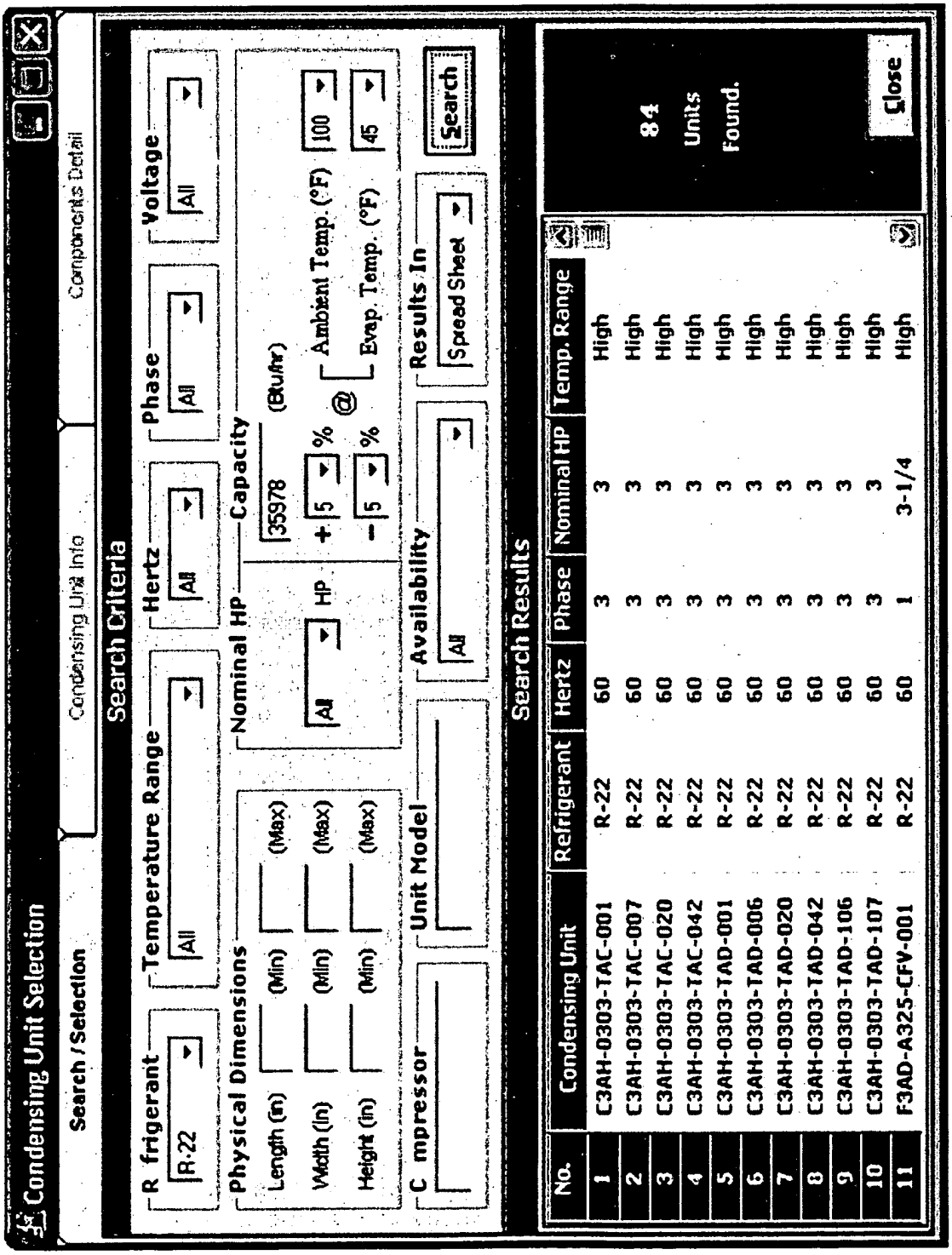

System Design Simulator [New File]
File Inputs Options Run View Tools Help
English Units
SI (Metric) Units
Accumulator
Condensing Unit
Folder Setting
Save Settings On Exit
Unit Model No NOT SELECTED
Temp. Range N/A
Horse Power N/A
Refrigerant N/A
Frequency N/A
Phase N/A
Voltage N/A
Condensing Unit
Flow Control
Evaporator
Control Type None
Cond. Exit Subcool (°F) 15.0
Comp. Superheat (°F) 16.0
Setting (°F) 80.0 db/67.0 wb
Frontal Area (Ft²) 21.9
Rows 4
Fin Density (Fins/in) 8
Air Flow (Ft³/Min) 1,200
Fan Power (Watt) 450

FIG 28



No.	Condensing Unit	Refrigerant	Hertz	Phase	Nominal HP	Temp. Range
1	C3AH-0303-TAC-001	R-22	60	3	3	High
2	C3AH-0303-TAC-007	R-22	60	3	3	High
3	C3AH-0303-TAC-020	R-22	60	3	3	High
4	C3AH-0303-TAC-042	R-22	60	3	3	High
5	C3AH-0303-TAD-001	R-22	60	3	3	High
6	C3AH-0303-TAD-006	R-22	60	3	3	High
7	C3AH-0303-TAD-020	R-22	60	3	3	High
8	C3AH-0303-TAD-042	R-22	60	3	3	High
9	C3AH-0303-TAD-106	R-22	60	3	3	High
10	C3AH-0303-TAD-107	R-22	60	3	3	High
11	F3AD-A325-CFV-001	R-22	60	1	3-1/4	High

FIG 29

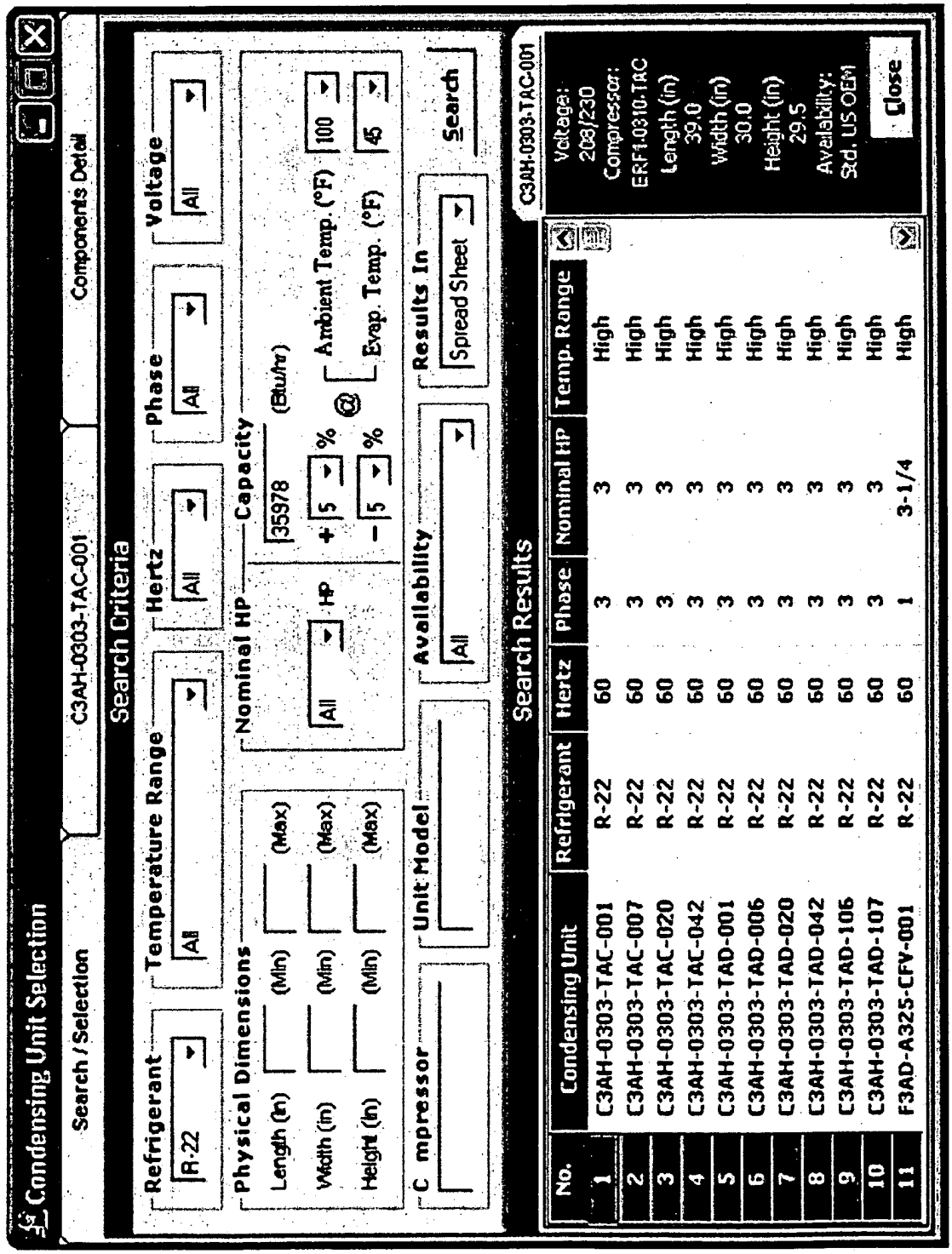

Condensing Unit Selection
Search / Selection
C3AH-0303-TAC-001
Components Detail
Search Criteria
Refrigerant
R-22
Temperature Range
All
Hertz
All
Phase
All
Voltage
All
Physical Dimensions
Length (in)
Width (in)
Height (in)
(Min)
(Max)
Nominal HP
All
HP
Capacity
35978
(Btu/hr)
+ 5 %
- 5 %
@
Ambient Temp. (°F) 100
Evap. Temp. (°F) 45
Compressor
Unit Model
Availability
All
Results In
Spread Sheet
Search
Search Results
C3AH-0303-TAC-001
Voltage: 208/230
Compressor: ERF1-0310-TAC
Length (in) 39.0
Width (in) 30.0
Height (in) 29.5
Availability: Std. US OEM
Close
No.
Condensing Unit
Refrigerant
Hertz
Phase
Nominal HP
Temp. Range
1 C3AH-0303-TAC-001 R-22 60 3 3 High
2 C3AH-0303-TAC-007 R-22 60 3 3 High
3 C3AH-0303-TAC-020 R-22 60 3 3 High
4 C3AH-0303-TAC-042 R-22 60 3 3 High
5 C3AH-0303-TAD-001 R-22 60 3 3 High
6 C3AH-0303-TAD-006 R-22 60 3 3 High
7 C3AH-0303-TAD-020 R-22 60 3 3 High
8 C3AH-0303-TAD-042 R-22 60 3 3 High
9 C3AH-0303-TAD-106 R-22 60 3 3 High
10 C3AH-0303-TAD-107 R-22 60 3 3 High
11 F3AD-A325-CFV-001 R-22 60 1 3-1/4 High

FIG 30

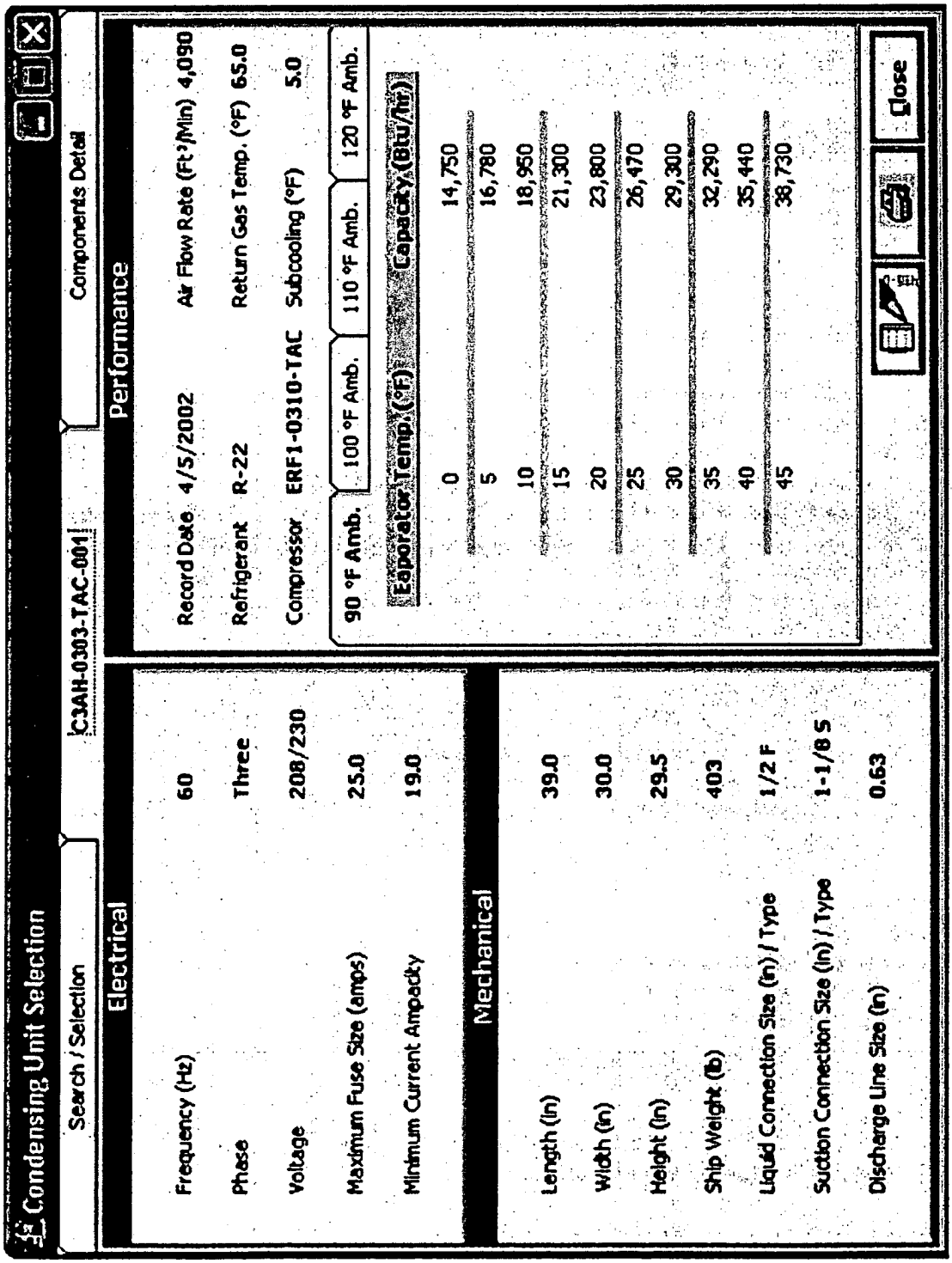

Condensing Unit Selection
Search / Selection
C3AH-0303-TAC-001
Components Detail
Electrical
Frequency (Hz) 60
Phase Three
Voltage 208/230
Maximum Fuse Size (amps) 25.0
Minimum Current Ampacity 19.0
Mechanical
Length (in) 39.0
Width (in) 30.0
Height (in) 29.5
Ship Weight (lb) 403
Liquid Connection Size (in) / Type 1/2 F
Suction Connection Size (in) / Type 1-1/8 S
Discharge Line Size (in) 0.63
Performance
Record Date 4/5/2002
Air Flow Rate (Ft³/Min) 4,090
Refrigerant R-22
Return Gas Temp. (°F) 65.0
Compressor ERF1-0310-TAC
Subcooling (°F) 5.0
90 °F Amb.
100 °F Amb.
110 °F Amb.
120 °F Amb.
Evaporator Temp. (°F)
Capacity (Btu/hr)
0 14,750
5 16,780
10 18,950
15 21,300
20 23,800
25 26,470
30 29,300
35 32,290
40 35,440
45 38,730
Close

FIG 31

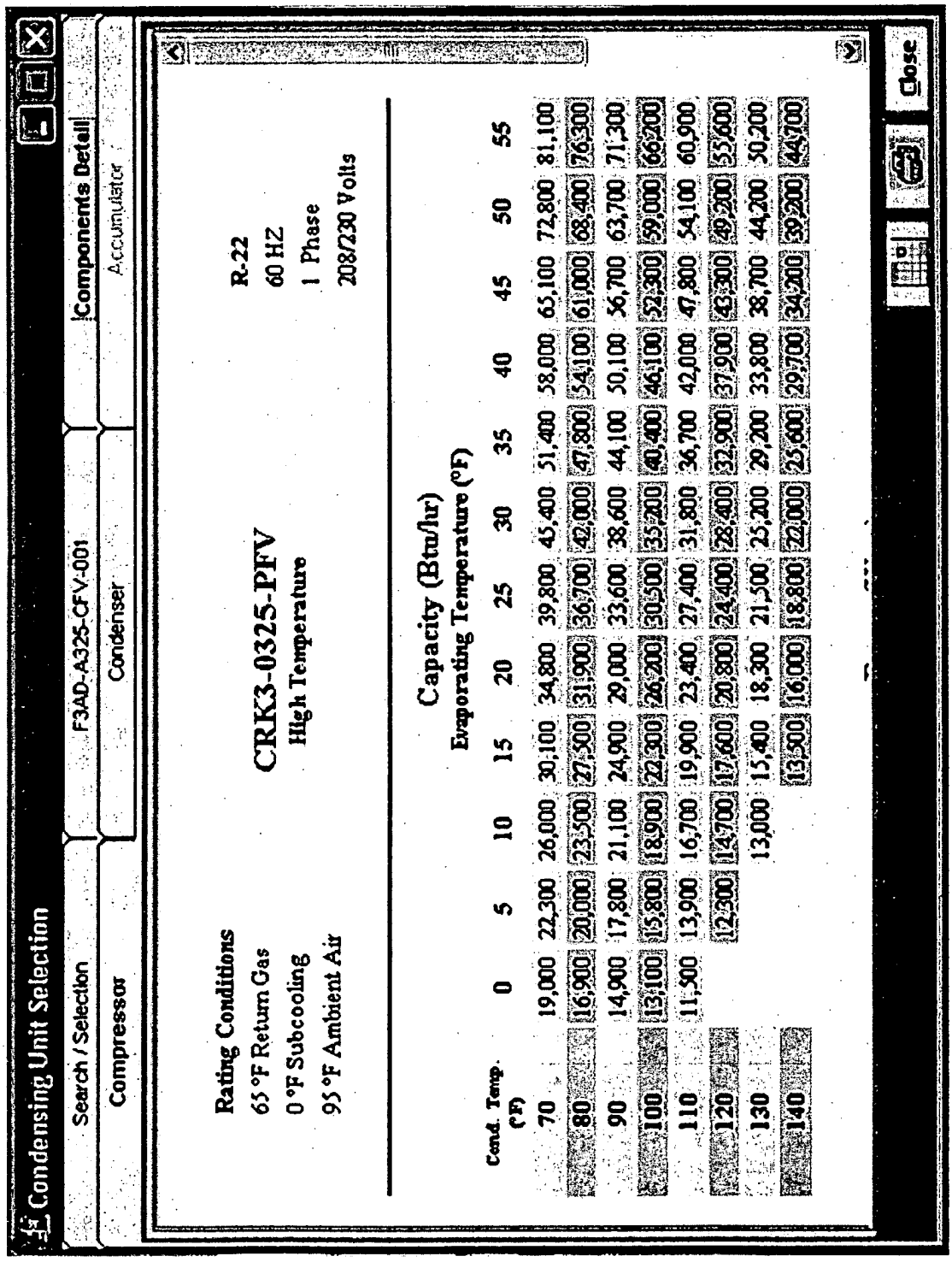

Condensing Unit Selection
Search / Selection
F3AD-A325-CFV-001
Components Detail
Compressor
Condenser
Accumulator
Rating Conditions
65 °F Return Gas
0 °F Subcooling
95 °F Ambient Air
CRK3-0325-PFV
High Temperature
R-22
60 HZ
1 Phase
208/230 Volts
Capacity (Btu/hr)
Evaporating Temperature (°F)
Cond. Temp. (°F)
0 5 10 15 20 25 30 35 40 45 50 55
70 19,000 22,300 26,000 30,100 34,800 39,800 45,400 51,400 58,000 65,100 72,800 81,100
80 16,900 20,000 23,500 27,500 31,900 36,700 42,000 47,800 54,100 61,000 68,400 76,300
90 14,900 17,800 21,100 24,900 29,000 33,600 38,600 44,100 50,100 56,700 63,700 71,300
100 13,100 15,800 18,900 22,300 26,200 30,500 35,200 40,400 46,100 52,300 59,000 66,200
110 11,500 13,900 16,700 19,900 23,400 27,400 31,800 36,700 42,000 47,800 54,100 60,900
120 12,300 14,700 17,600 20,800 24,400 28,400 32,900 37,900 43,300 49,200 55,600
130 13,000 15,400 18,300 21,500 25,200 29,200 33,800 38,700 44,200 50,200
140 13,500 16,000 18,800 22,000 25,600 29,700 34,200 39,200 44,700
Close

FIG 32

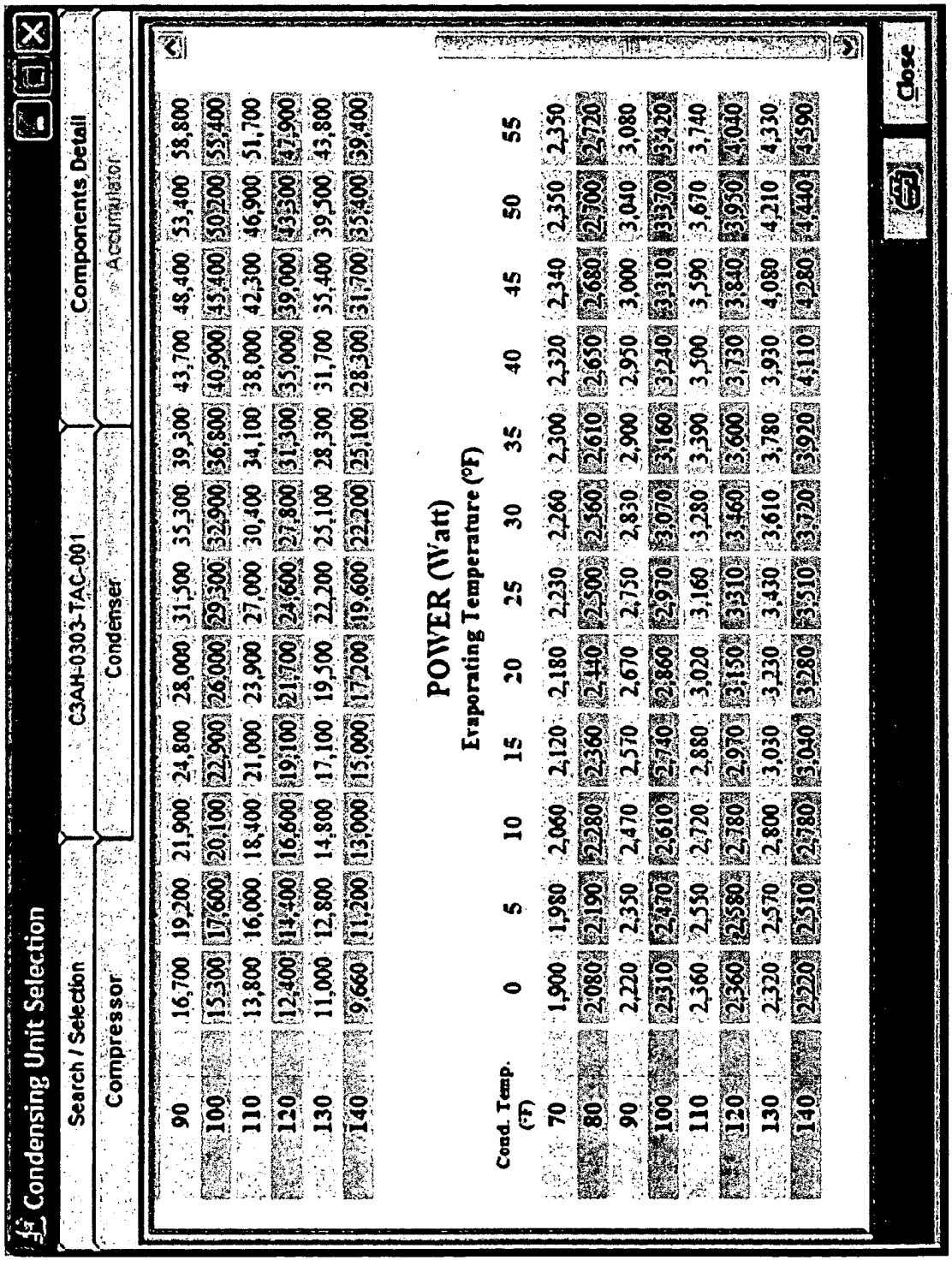

Condensing Unit Selection
Search / Selection
C3AH-0303-TAC-001
Components Detail
Compressor
Condenser
Accumulator
POWER (Watt)
Evaporating Temperature (°F)
Cond. Temp. (°F)
0 5 10 15 20 25 30 35 40 45 50 55
90 16,700 19,200 21,900 24,800 28,000 31,500 35,300 39,300 43,700 48,400 53,400 58,800
100 15,300 17,600 20,100 22,900 26,000 29,300 32,900 36,800 40,900 45,400 50,200 55,400
110 13,800 16,000 18,400 21,000 23,900 27,000 30,400 34,100 38,000 42,300 46,900 51,700
120 12,400 14,400 16,600 19,100 21,700 24,600 27,800 31,300 35,000 39,000 43,300 47,900
130 11,000 12,800 14,800 17,100 19,500 22,200 25,100 28,300 31,700 35,400 39,500 43,800
140 9,660 11,200 13,000 15,000 17,200 19,600 22,200 25,100 28,300 31,700 35,400 39,400
70 1,900 1,980 2,060 2,120 2,180 2,230 2,260 2,300 2,320 2,340 2,350 2,350
80 2,080 2,190 2,280 2,360 2,440 2,500 2,560 2,610 2,650 2,680 2,700 2,720
90 2,220 2,350 2,470 2,570 2,670 2,750 2,830 2,900 2,950 3,000 3,040 3,080
100 2,310 2,470 2,610 2,740 2,860 2,970 3,070 3,160 3,240 3,310 3,370 3,420
110 2,360 2,550 2,720 2,880 3,020 3,160 3,280 3,390 3,500 3,590 3,670 3,740
120 2,360 2,580 2,780 2,970 3,150 3,310 3,460 3,600 3,730 3,840 3,950 4,040
130 2,320 2,570 2,800 3,030 3,230 3,430 3,610 3,780 3,930 4,080 4,210 4,330
140 2,220 2,510 2,780 3,040 3,280 3,510 3,720 3,920 4,110 4,280 4,440 4,590
Close

FIG 33

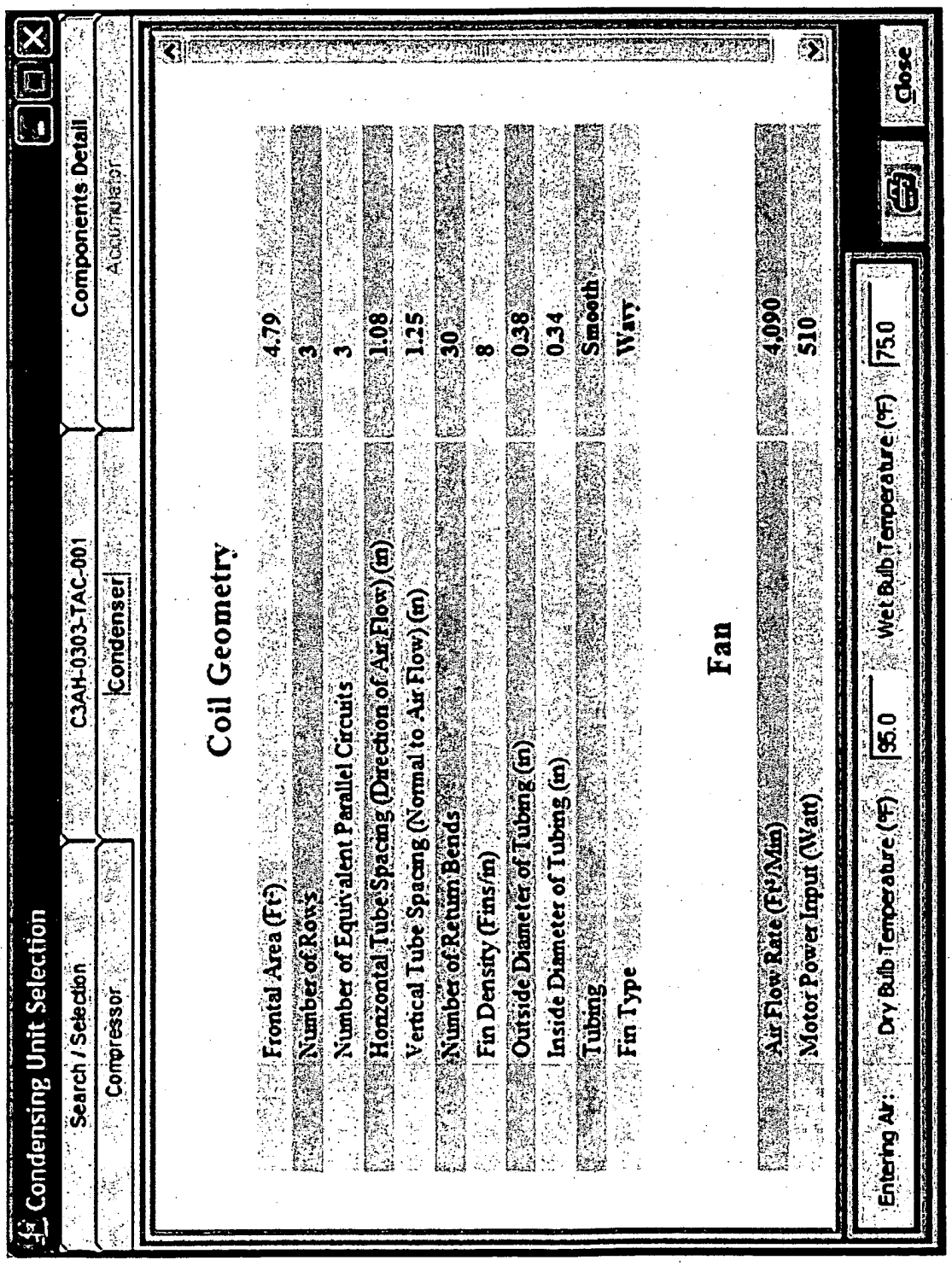

Condensing Unit Selection
Search / Selection
C3AH-0303-TAC-001
Components Detail
Compressor
Condenser
Accumulator
Coil Geometry
Frontal Area (Ft²) 4.79
Number of Rows 3
Number of Equivalent Parallel Circuits 3
Horizontal Tube Spacing (Direction of Air Flow) (in) 1.08
Vertical Tube Spacing (Normal to Air Flow) (in) 1.25
Number of Return Bends 30
Fin Density (Fins/in) 8
Outside Diameter of Tubing (in) 0.38
Inside Diameter of Tubing (in) 0.34
Tubing Smooth
Fin Type Wavy
Fan
Air Flow Rate (FPM/Min) 4,090
Motor Power Input (Watt) 510
Entering Air : Dry Bulb Temperature (°F) 95.0 Wet Bulb Temperature (°F) 75.0
Close

FIG 34

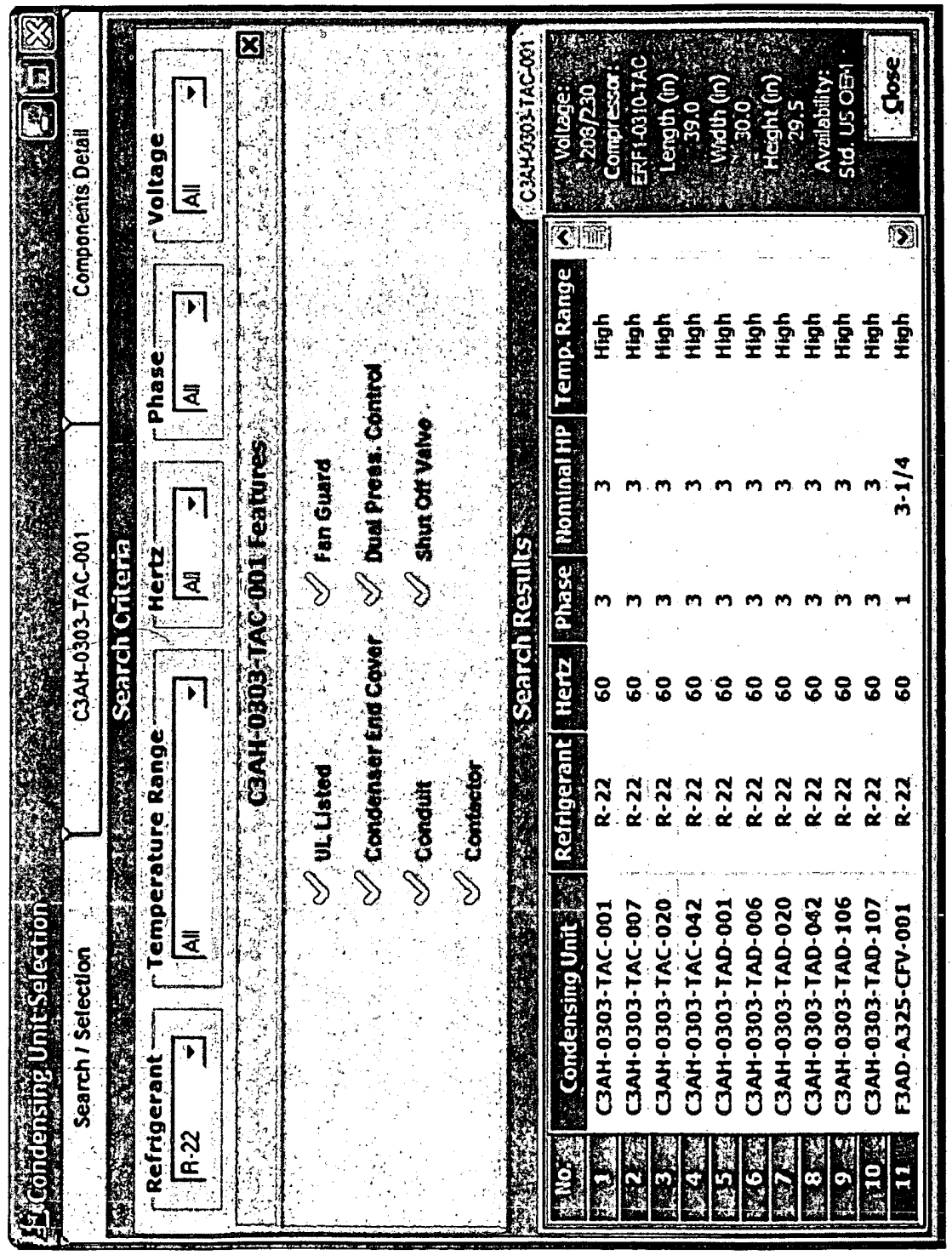

Condensing Unit Selection
Search / Selection
C3AH-0303-TAC-001
Components Detail
Search Criteria
Refrigerant
R-22
Temperature Range
All
Hertz
All
Phase
All
Voltage
All
C3AH-0303-TAC-001 Features
UL Listed
Fan Guard
Condenser End Cover
Dual Press. Control
Conduit
Shut Off Valve
Contactor
Search Results
C3AH-0303-TAC-001
Voltage: 208/230
Compressor: ERF1-0310-TAC
Length (in) 39.0
Width (in) 30.0
Height (in) 29.5
Availability: Std. US OEM
Close
No.
Condensing Unit
Refrigerant
Hertz
Phase
Nominal HP
Temp. Range
1 C3AH-0303-TAC-001 R-22 60 3 3 High
2 C3AH-0303-TAC-007 R-22 60 3 3 High
3 C3AH-0303-TAC-020 R-22 60 3 3 High
4 C3AH-0303-TAC-042 R-22 60 3 3 High
5 C3AH-0303-TAD-001 R-22 60 3 3 High
6 C3AH-0303-TAD-006 R-22 60 3 3 High
7 C3AH-0303-TAD-020 R-22 60 3 3 High
8 C3AH-0303-TAD-042 R-22 60 3 3 High
9 C3AH-0303-TAD-106 R-22 60 3 3 High
10 C3AH-0303-TAD-107 R-22 60 3 3 High
11 F3AD-A325-CFV-001 R-22 60 1 3-1/4 High

FIG 35

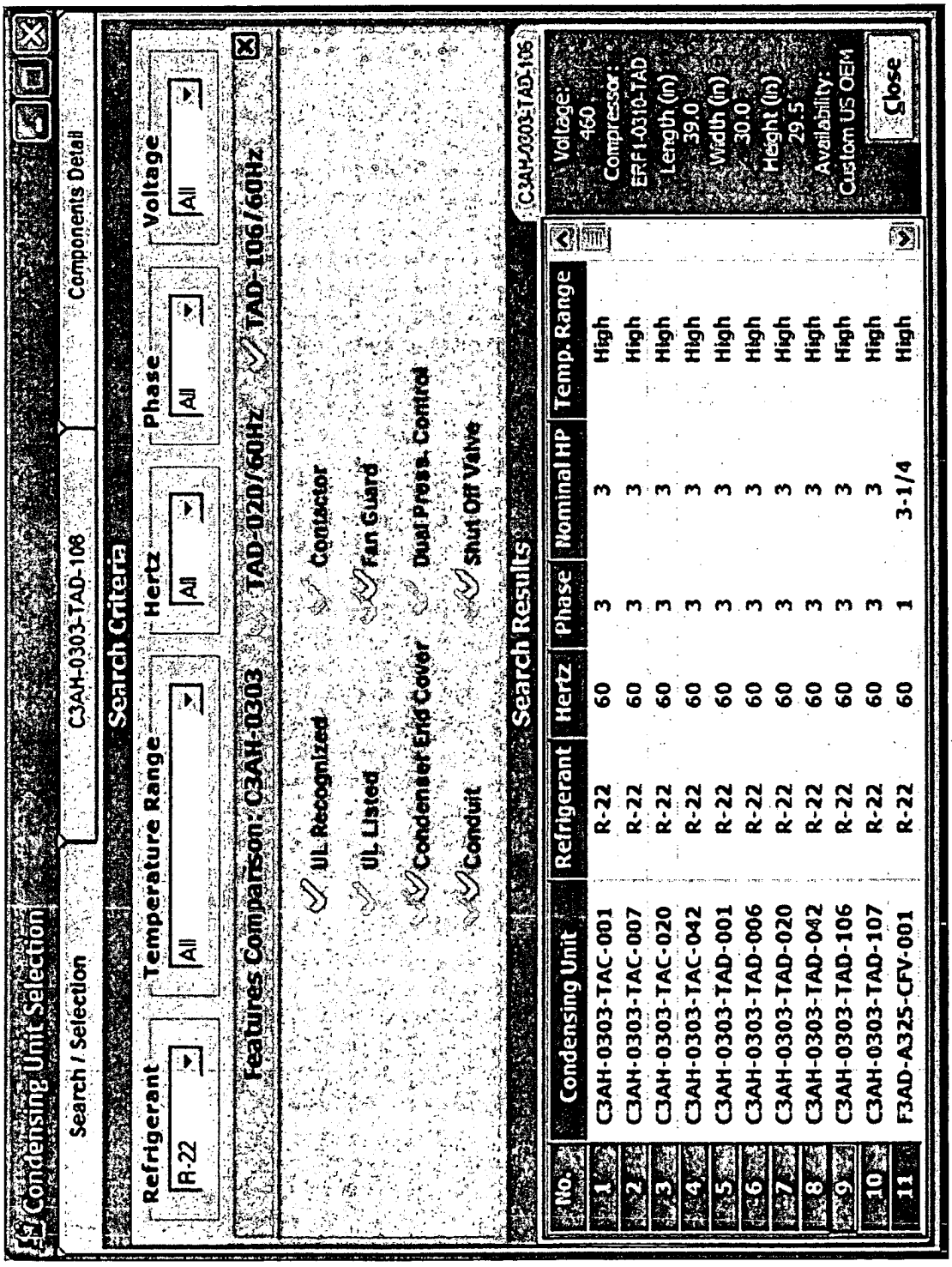

Condensing Unit Selection
Search / Selection
C3AH-0303-TAD-108
Components Detail
Search Criteria
Refrigerant
R-22
Temperature Range
All
Hertz
All
Phase
All
Voltage
All
Features Comparison: C3AH-0303
TAD-020/60Hz
TAD-106/60Hz
UL Recognized
Contactor
UL Listed
Fan Guard
Condenser Grid Cover
Dual Press. Control
Conduit
Shut Off Valve
Search Results
C3AH-0303-TAD-105
Voltage: 460
Compressor: EF1-0310-TAD
Length (in) 39.0
Width (in) 30.0
Height (in) 29.5
Availability: Custom US OEM
Close
No.
Condensing Unit
Refrigerant
Hertz
Phase
Nominal HP
Temp. Range
1 C3AH-0303-TAC-001 R-22 60 3 3 High
2 C3AH-0303-TAC-007 R-22 60 3 3 High
3 C3AH-0303-TAC-020 R-22 60 3 3 High
4 C3AH-0303-TAC-042 R-22 60 3 3 High
5 C3AH-0303-TAD-001 R-22 60 3 3 High
6 C3AH-0303-TAD-006 R-22 60 3 3 High
7 C3AH-0303-TAD-020 R-22 60 3 3 High
8 C3AH-0303-TAD-042 R-22 60 3 3 High
9 C3AH-0303-TAD-106 R-22 60 3 3 High
10 C3AH-0303-TAD-107 R-22 60 3 3 High
11 F3AD-A325-CFV-001 R-22 60 1 3-1/4 High

FIG 36

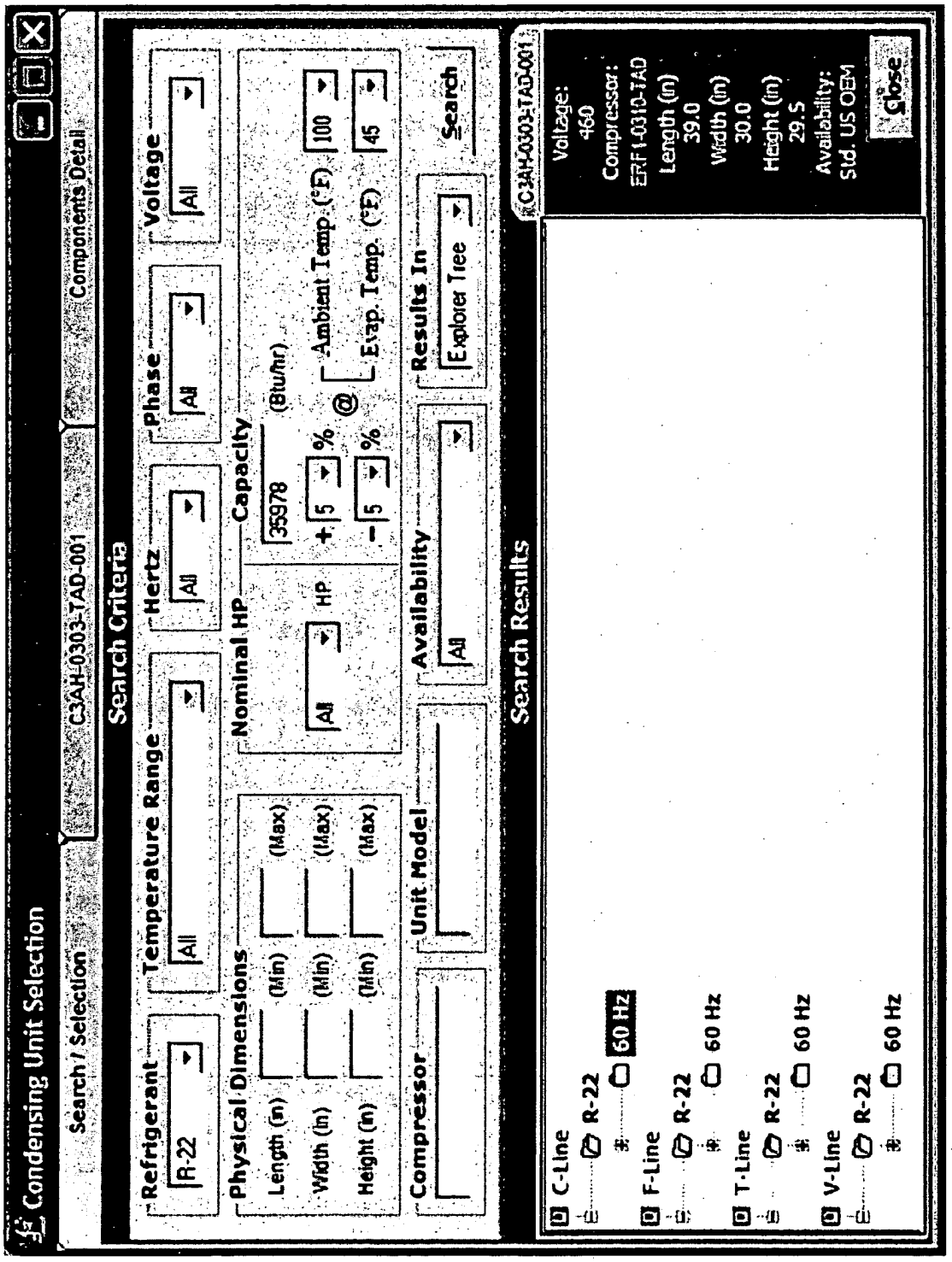

Condensing Unit Selection
Search / Selection
C3AH-0303-TAD-001
Components Detail
Search Criteria
Refrigerant
R-22
Temperature Range
All
Hertz
All
Phase
All
Voltage
All
Physical Dimensions
Length (in)
Width (in)
Height (in)
(Min)
(Max)
Nominal HP
All
HP
Capacity
35978
(Btu/hr)
+ 5 %
- 5 %
@
Ambient Temp (°F)
100
Evap. Temp. (°F)
45
Compressor
Unit Model
Availability
All
Results In
Explorer Tree
Search
Search Results
C3AH-0303-TAD-001
C-Line
R-22
60 Hz
F-Line
R-22
60 Hz
T-Line
R-22
60 Hz
V-Line
R-22
60 Hz
Voltage:
460
Compressor:
ER F1-0310-TAD
Length (in)
39.0
Width (in)
30.0
Height (in)
29.5
Availability:
Std. US OEM
Close

FIG 37

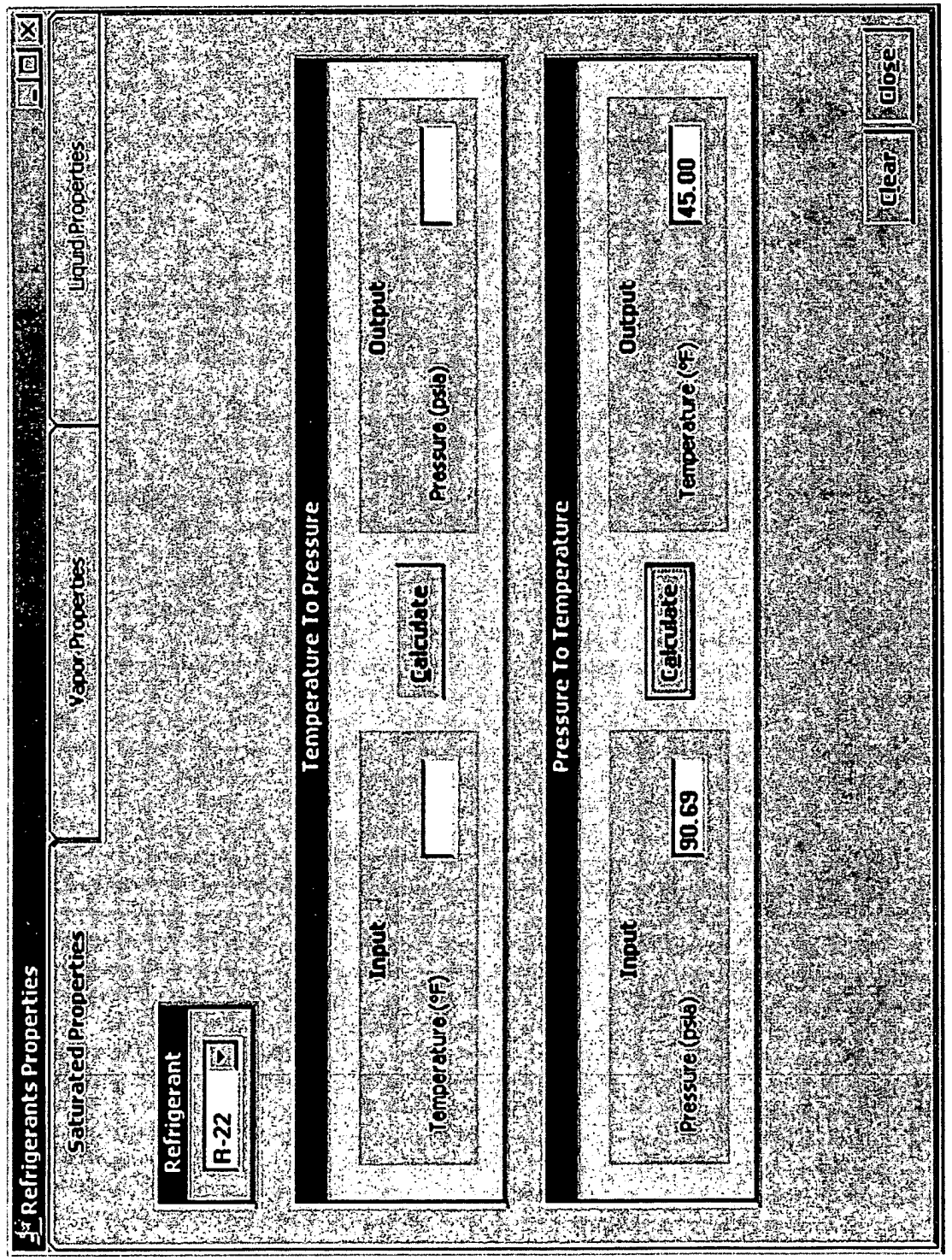

Refrigerants Properties
Saturated Properties
Vapor Properties
Liquid Properties
Refrigerant
R-22
Temperature To Pressure
Input
Temperature (°F)
Calculate
Output
Pressure (psia)
Pressure To Temperature
Input
Pressure (psia)
90.69
Calculate
Output
Temperature (°F)
45.00
Clear
Close

FIG 38

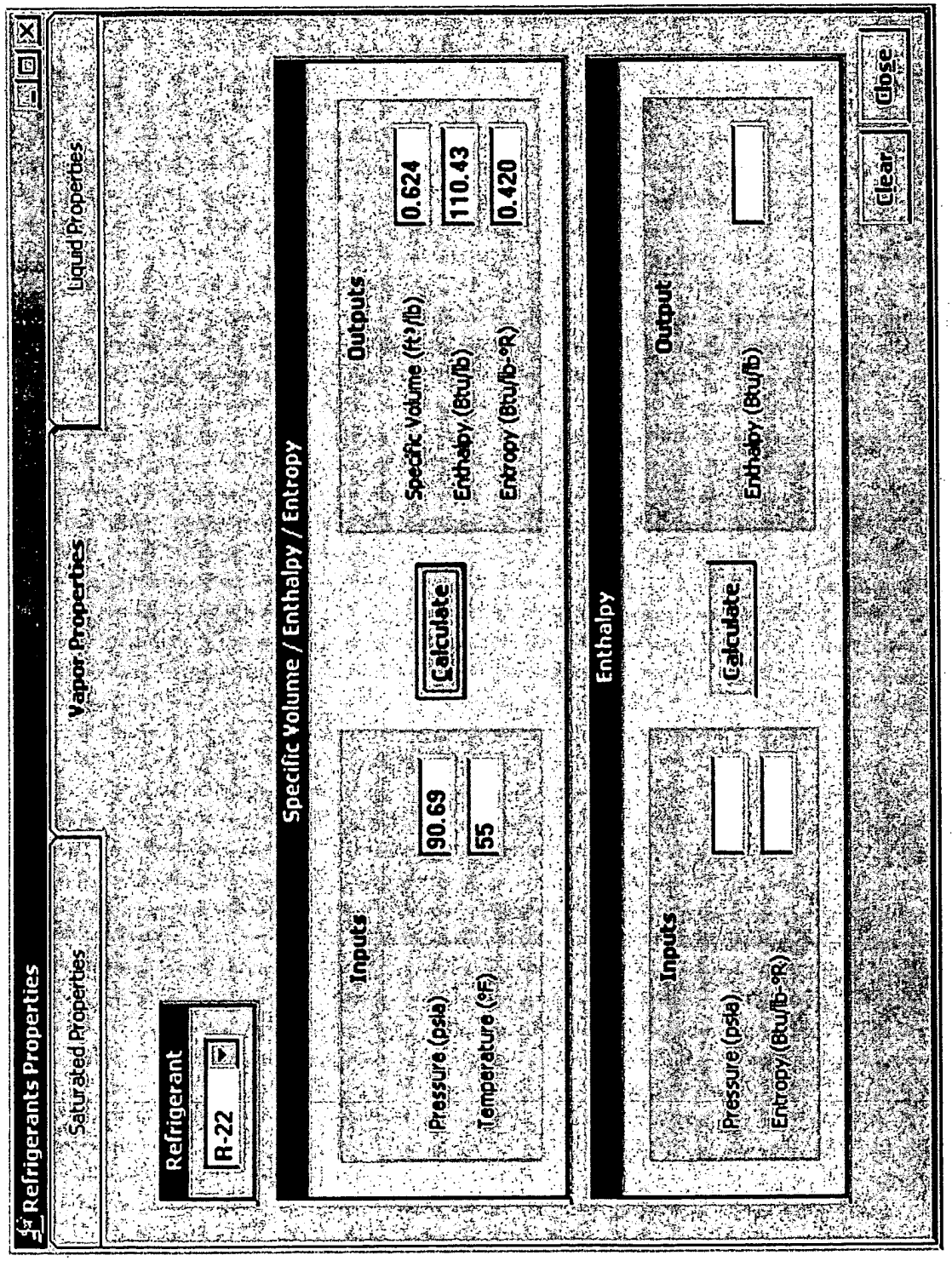

Refrigerants Properties
Saturated Properties
Vapor Properties
Liquid Properties
Refrigerant
R-22
Specific Volume / Enthalpy / Entropy
Inputs
Pressure (psia)
90.69
Temperature (°F)
55
Calculate
Outputs
Specific Volume (ft³/lb)
0.624
Enthalpy (Btu/lb)
110.43
Entropy (Btu/lb-°R)
0.420
Enthalpy
Inputs
Pressure (psia)
Entropy (Btu/lb-°R)
Calculate
Output
Enthalpy (Btu/lb)
Clear
Close

FIG 39

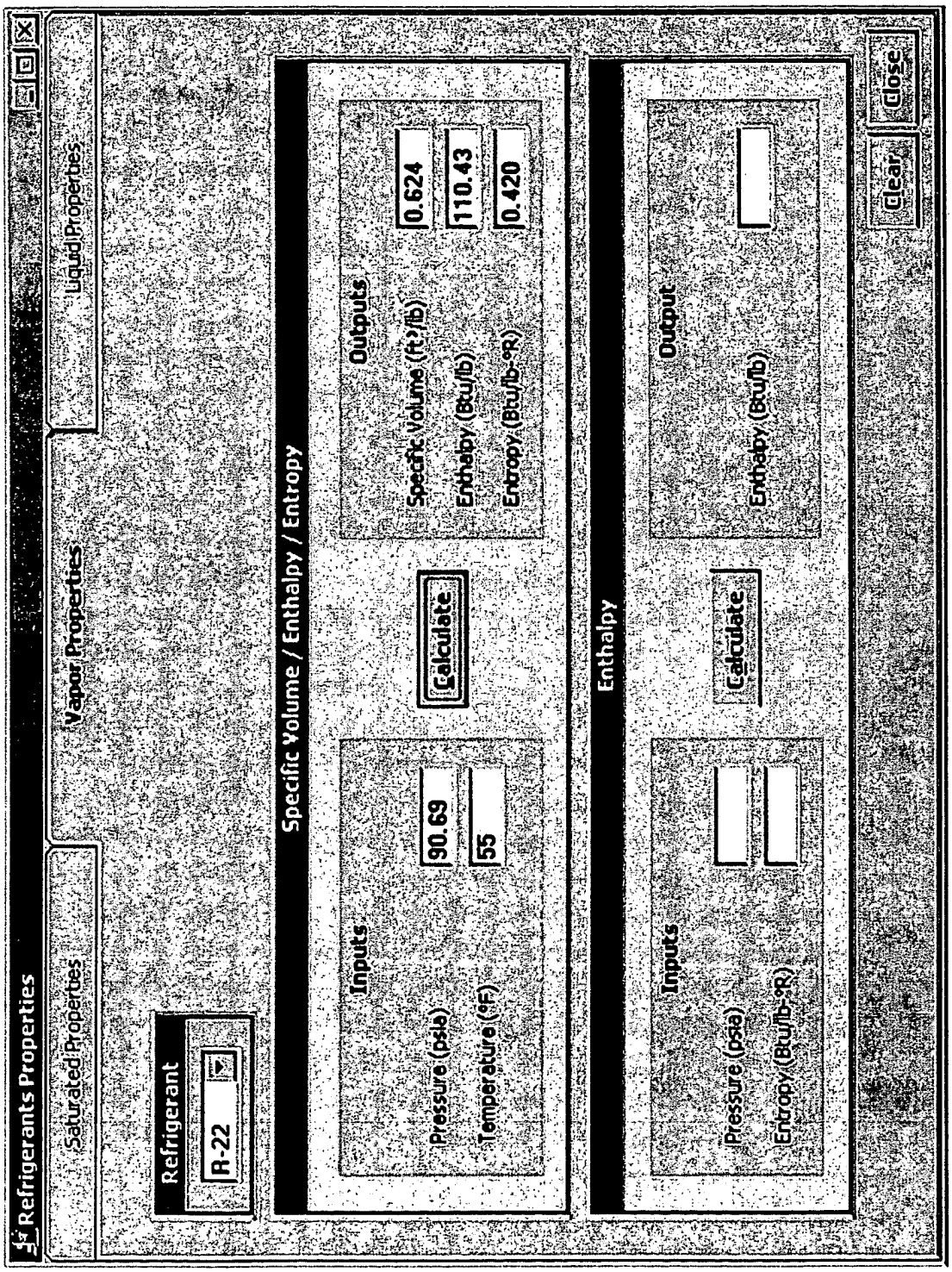

Refrigerants Properties
Saturated Properties
Vapor Properties
Liquid Properties
Refrigerant
R-22
Specific Volume / Enthalpy / Entropy
Inputs
Pressure (psia)
90.69
Temperature (°F)
55
Calculate
Outputs
Specific Volume (ft³/lb)
0.624
Enthalpy (Btu/lb)
110.43
Entropy (Btu/lb-°R)
0.420
Enthalpy
Inputs
Pressure (psia)
Entropy (Btu/lb-°R)
Calculate
Output
Enthalpy (Btu/lb)
Clear
Close

FIG 40

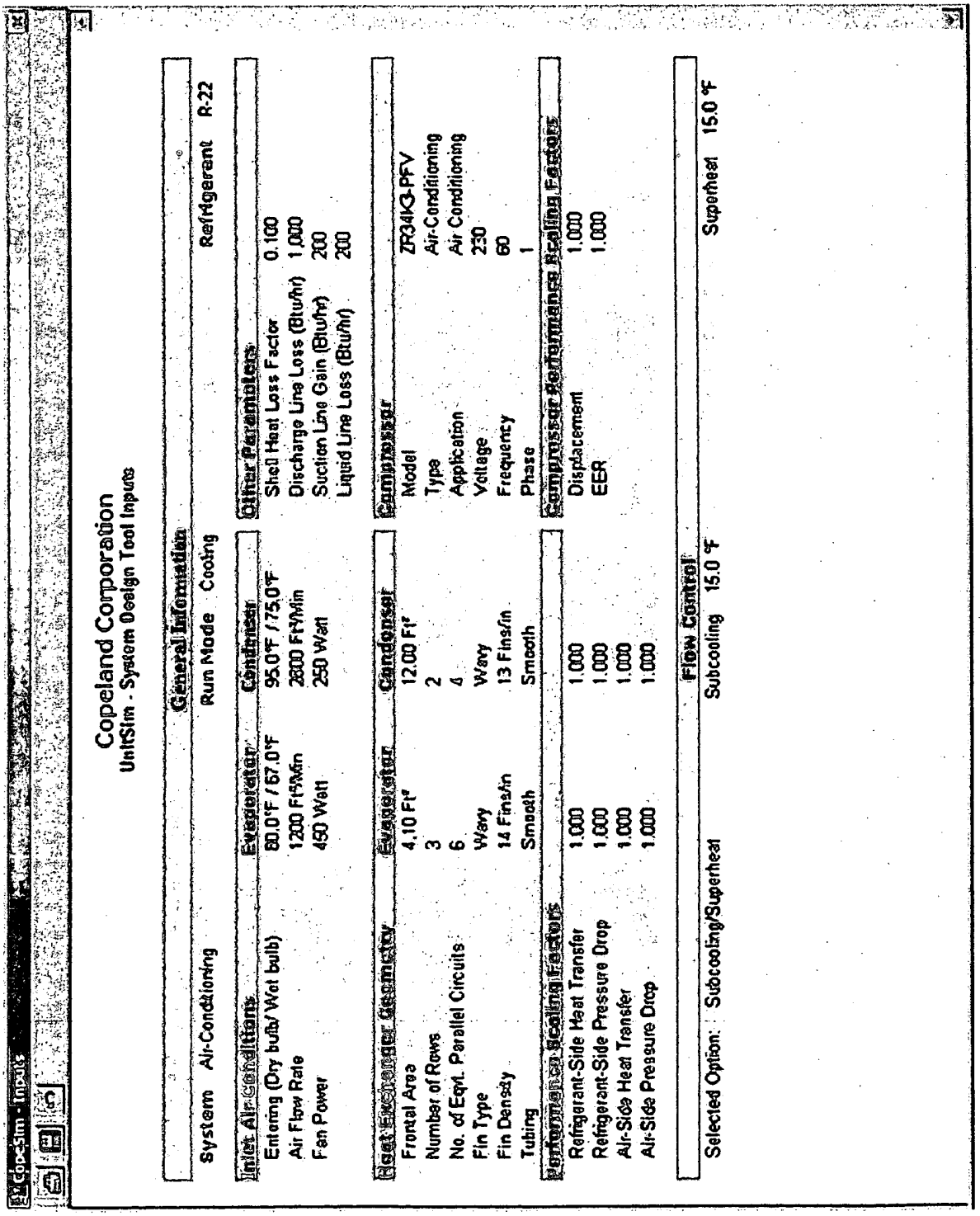

Copeland Corporation
UnitSim - System Design Tool Inputs
General Information
System Air-Conditioning
Run Mode Cooling
Refrigerant R-22
Inlet Air-Conditions
Evaporator
Condenser
Entering (Dry bulb/ Wet bulb)
80.0°F / 67.0°F
95.0°F / 75.0°F
Air Flow Rate
1200 Ft³/Min
2800 Ft³/Min
Fan Power
450 Watt
250 Watt
Other Parameters
Shell Heat Loss Factor
0.100
Discharge Line Loss (Btu/hr)
1,000
Suction Line Gain (Btu/hr)
200
Liquid Line Loss (Btu/hr)
200
Heat Exchanger Geometry
Evaporator
Condenser
Frontal Area
4.10 Ft²
12.00 Ft²
Number of Rows
3
2
No. of Eqvt. Parallel Circuits
6
4
Fin Type
Wavy
Wavy
Fin Density
14 Fins/in
13 Fins/in
Tubing
Smooth
Smooth
Performance Scaling Factors
Refrigerant-Side Heat Transfer
1.000
1.000
Refrigerant-Side Pressure Drop
1.000
1.000
Air-Side Heat Transfer
1.000
1.000
Air-Side Pressure Drop
1.000
1.000
Compressor
Model
ZR34K3-PFV
Type
Air-Conditioning
Application
Air Conditioning
Voltage
230
Frequency
60
Phase
1
Compressor Performance Scaling Factors
Displacement
1.000
EER
1.000
Flow Control
Selected Option: Subcooling/Superheat
Subcooling 15.0 °F
Superheat 15.0 °F

FIG 41

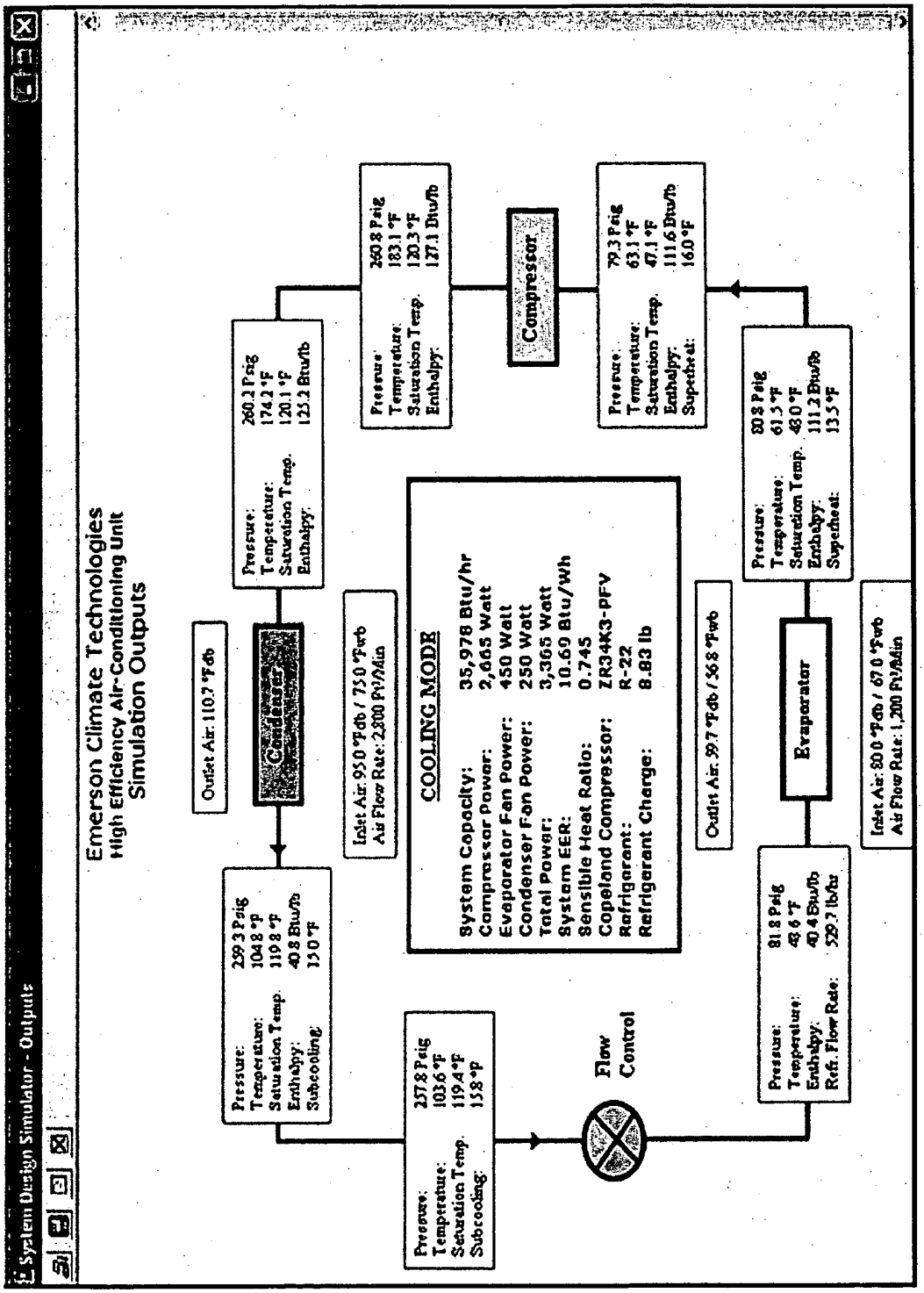

System Design Simulator - Outputs
Emerson Climate Technologies
High Efficiency Air-Conditioning Unit
Simulation Outputs
COOLING MODE
System Capacity: 35,978 Btu/hr
Compressor Power: 2,665 Watt
Evaporator Fan Power: 450 Watt
Condenser Fan Power: 250 Watt
Total Power: 3,365 Watt
System EER: 10.69 Btu/Wh
Sensible Heat Ratio: 0.745
Copeland Compressor: ZR34K3-PFV
Refrigerant: R-22
Refrigerant Charge: 8.83 lb
Condenser
Compressor
Evaporator
Flow Control
Outlet Air: 110.7 °Fdb
Inlet Air: 95.0 °Fdb / 75.0 °Fwb
Air Flow Rate: 2,800 Ft³/Min
Outlet Air: 59.7 °Fdb / 56.8 °Fwb
Inlet Air: 80.0 °Fdb / 67.0 °Fwb
Air Flow Rate: 1,200 Ft³/Min

FIG 42

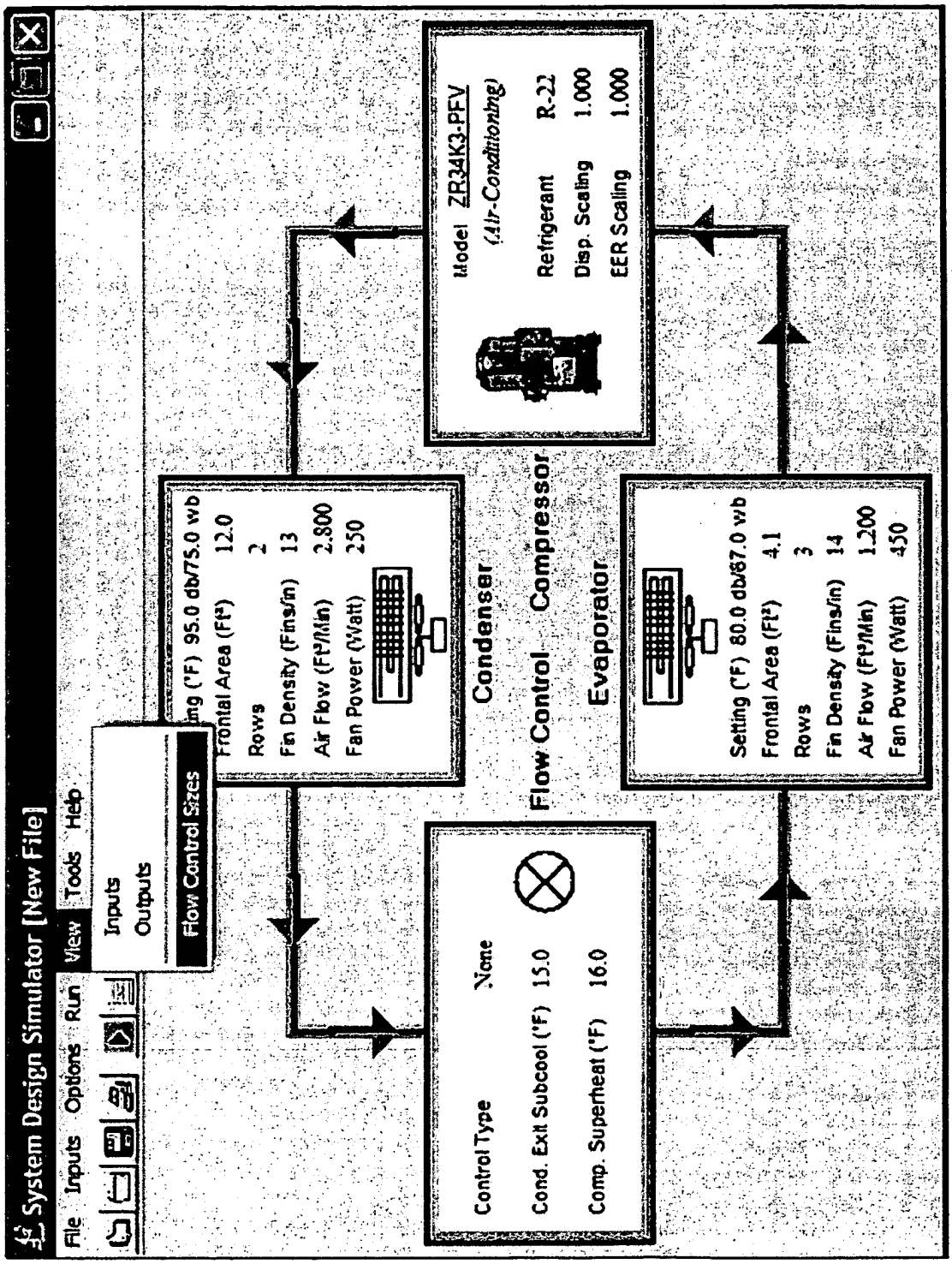

System Design Simulator [New File]
File Inputs Options Run View Tools Help
Inputs
Outputs
Flow Control Sizes
Model ZR34K3-PFV
(Air-Conditioning)
Refrigerant R-22
Disp. Scaling 1.000
EER Scaling 1.000
Condenser
Frontal Area (Ft²) 12.0
Rows 2
Fin Density (Fins/in) 13
Air Flow (Ft³/Min) 2,800
Fan Power (Watt) 250
Flow Control
Compressor
Evaporator
Setting (°F) 80.0 db/67.0 wb
Frontal Area (Ft²) 4.1
Rows 3
Fin Density (Fins/in) 14
Air Flow (Ft³/Min) 1,200
Fan Power (Watt) 450
Control Type None
Cond. Exit Subcool (°F) 15.0
Comp. Superheat (°F) 16.0

FIG 43

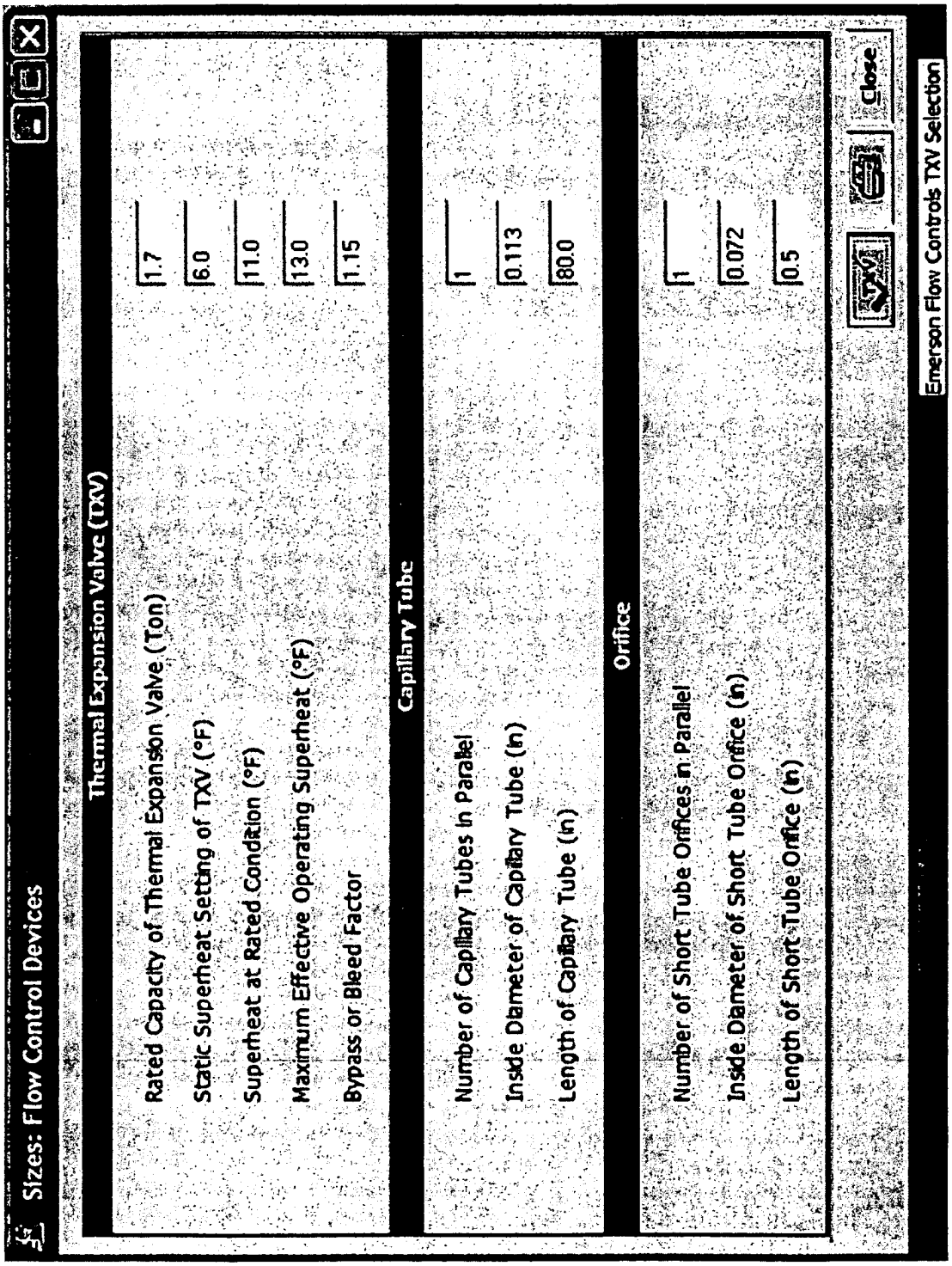

Sizes: Flow Control Devices
Thermal Expansion Valve (TXV)
Rated Capacity of Thermal Expansion Valve (Ton)
1.7
Static Superheat Setting of TXV (°F)
6.0
Superheat at Rated Condition (°F)
11.0
Maximum Effective Operating Superheat (°F)
13.0
Bypass or Bleed Factor
1.15
Capillary Tube
Number of Capillary Tubes in Parallel
1
Inside Diameter of Capillary Tube (in)
0.113
Length of Capillary Tube (in)
80.0
Orifice
Number of Short Tube Orifices in Parallel
1
Inside Diameter of Short Tube Orifice (in)
0.072
Length of Short Tube Orifice (in)
0.5
Close
Emerson Flow Controls TXV Selection

FIG 44

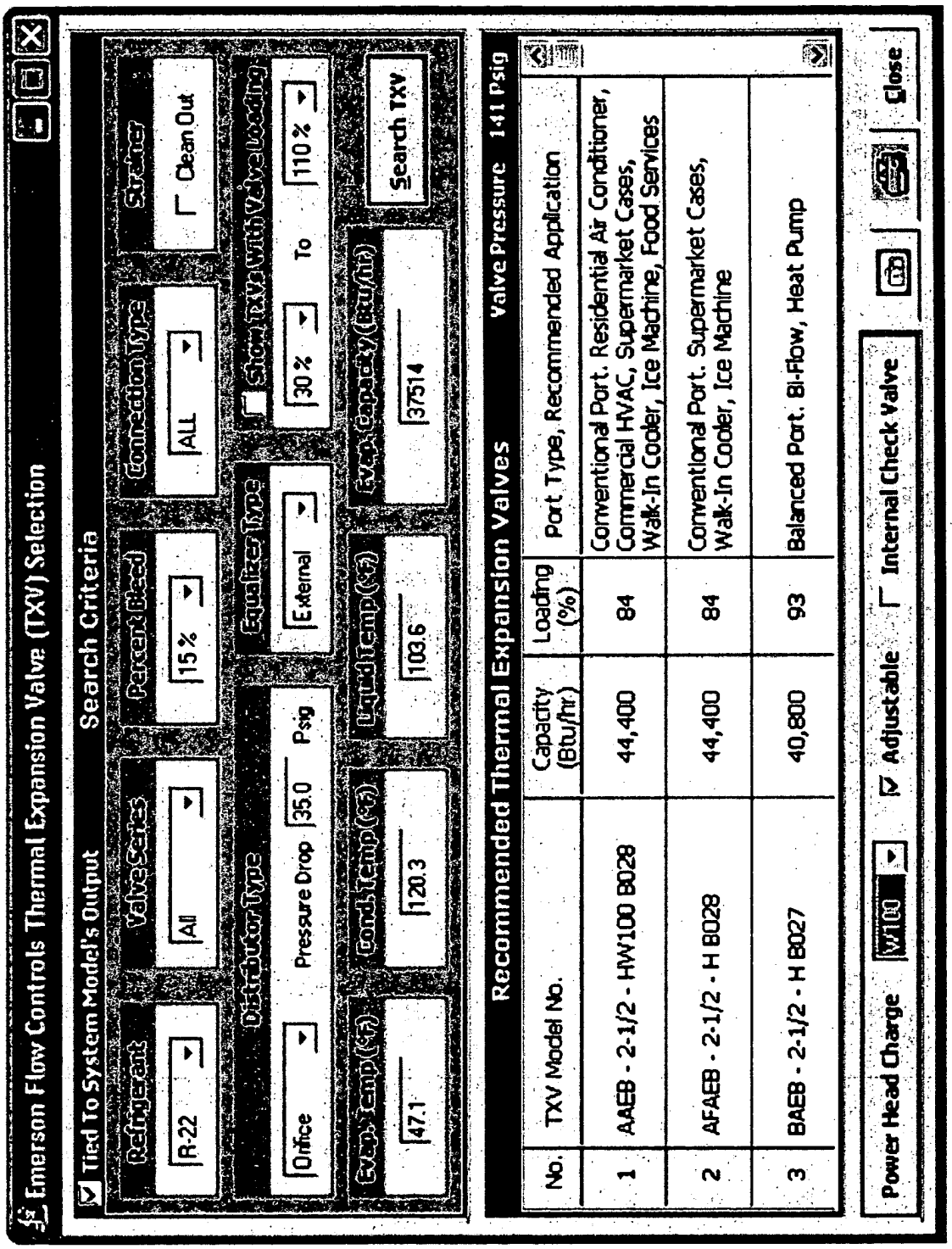

Emerson Flow Controls Thermal Expansion Valve (TXV) Selection
Tied To System Model's Output
Search Criteria
Refrigerant
R-22
Valve Series
All
Percent Bleed
15 %
Connection Type
ALL
Strainer
Clean Out
Distributor Type
Orifice
Pressure Drop
35.0
Psig
Equalizer Type
External
Show TXVs With Valve Loading
30 %
To
110 %
Evap. Temp (°F)
47.1
Cond. Temp (°F)
120.3
Liquid Temp (°F)
103.6
Evap. Capacity (Btu/hr)
37514
Search TXV
Recommended Thermal Expansion Valves
Valve Pressure 141 Psig
No.
TXV Model No.
Capacity (Btu/hr)
Loading (%)
Port Type, Recommended Application
1
AAEB - 2-1/2 - HW100 B028
44,400
84
Conventional Port, Residential Air Conditioner, Commercial HVAC, Supermarket Cases, Walk-In Cooler, Ice Machine, Food Services
2
AFAEB - 2-1/2 - H B028
44,400
84
Conventional Port, Supermarket Cases, Walk-In Cooler, Ice Machine
3
BAEB - 2-1/2 - H B027
40,800
93
Balanced Port, Bi-Flow, Heat Pump
Power Head Charge
W100
Adjustable
Internal Check Valve
Close

FIG 45

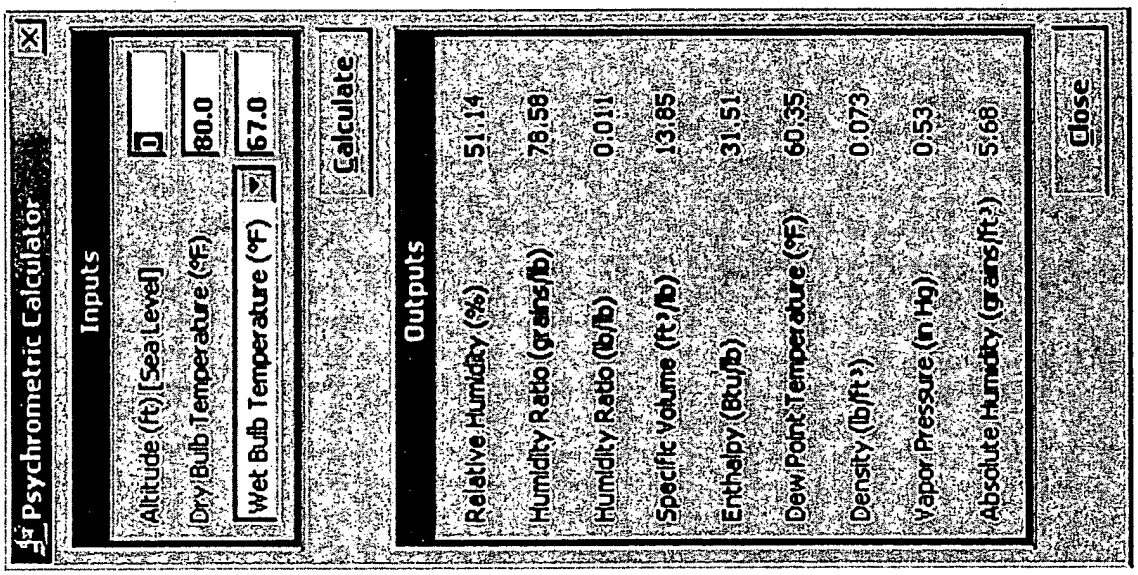

Psychrometric Calculator
Inputs
Altitude (ft) [Sea Level]
0
Dry Bulb Temperature (°F)
80.0
Wet Bulb Temperature (°F)
67.0
Calculate
Outputs
Relative Humidity (%)
51.14
Humidity Ratio (grains/lb)
78.58
Humidity Ratio (lb/lb)
0.011
Specific Volume (ft³/lb)
13.85
Enthalpy (Btu/lb)
31.51
Dew Point Temperature (°F)
60.35
Density (lb/ft³)
0.073
Vapor Pressure (in Hg)
0.53
Absolute Humidity (grains/ft³)
5.68
Close

FIG 46

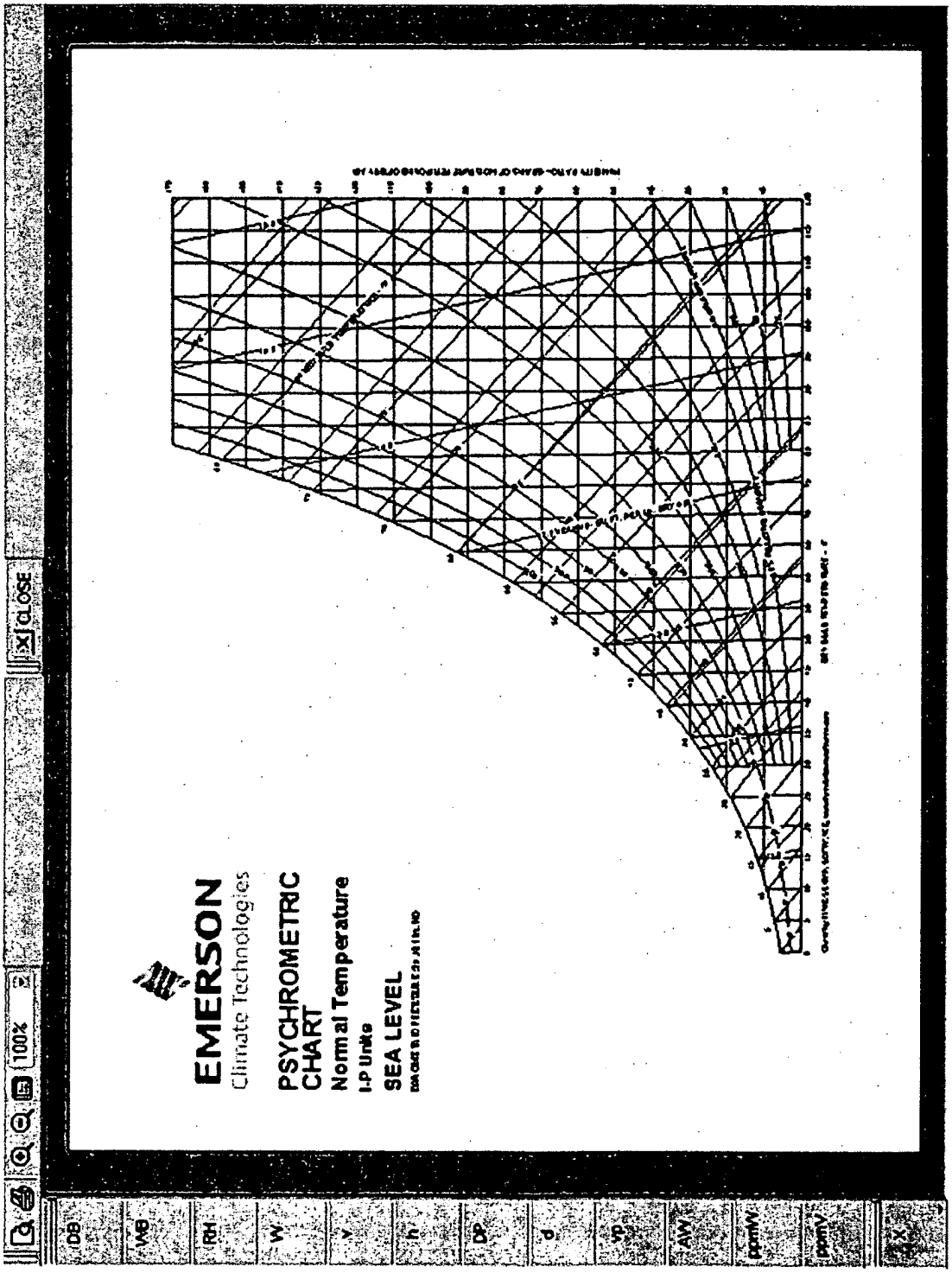
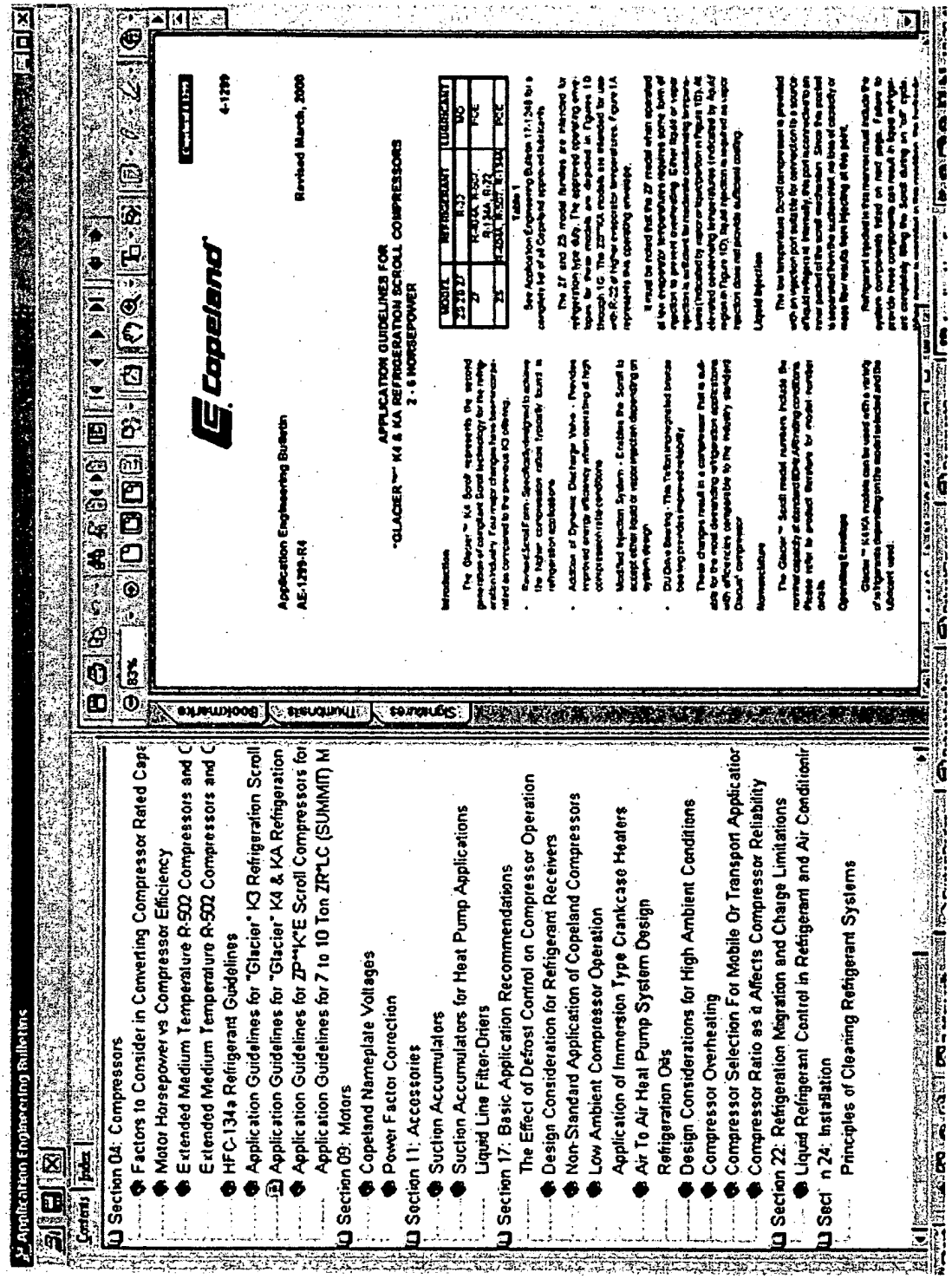

EMERSON
Climate Technologies
PSYCHROMETRIC CHART
Normal Temperature
I-P Units
SEA LEVEL
DB
WB
RH
W
v
h
DP
P
Sp
AW
ppmW
ppmV

FIG 47


Application Engineering Bulletins
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Extended Medium Temperature R-502 Compressors and C
HFC-134a Refrigerant Guidelines
Application Guidelines for "Glacier" KQ Refrigeration Scroll
Application Guidelines for "Glacier" K4 & KA Refrigeration
Application Guidelines for ZP**KE Scroll Compressors for
Application Guidelines for 7 to 10 Ton ZP*LC (SUMMIT) M
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Copeland Nameplate Voltages
Power Factor Correction
Section 11: Accessories
Suction Accumulators
Suction Accumulators for Heat Pump Applications
Liquid Line Filter-Driers
Section 17: Basic Application Recommendations
The Effect of Defrost Control on Compressor Operation
Design Consideration for Refrigerant Receivers
Non-Standard Application of Copeland Compressors
Low Ambient Compressor Operation
Application of Immersion Type Crankcase Heaters
Air To Air Heat Pump System Design
Refrigeration Oils
Design Considerations for High Ambient Conditions
Compressor Overheating
Compressor Selection For Mobile Or Transport Applicatior
Compressor Ratio as it Affects Compressor Reliability
Section 22: Refrigeration Migration and Charge Limitations
Liquid Refrigerant Control in Refrigerant and Air Conditionir
Sect n 24: Installation
Principles of Cleaning Refrigerant Systems
Bookmarks
Thumbnails
Signatures
83%
Copeland
Application Engineering Bulletin
AE-1299-R4
Revised March, 2000
APPLICATION GUIDELINES FOR
"GLACIER™" K4 & KA REFRIGERATION SCROLL COMPRESSORS
2 - 6 HORSEPOWER
Introduction

FIG 48